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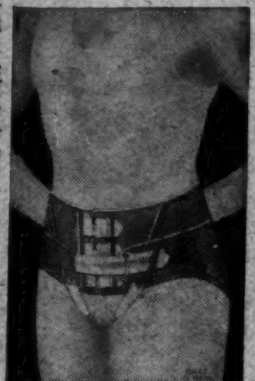

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# RECENT ADVANCES IN OUR KNOWLEDGE OF THE Rh FACTOR*

BY

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It seems appropriate to begin with a general survey of the problems which knowledge of the Rh factor has helped to clarify. As usual in scientific work, the problems become more complex as further insight is obtained, but without doubt the present state of knowledge is an immense advance over the conditions prevailing ten years ago, when Darrow (1938) so fully reviewed what was then known about the aetiology of haemolytic disease of the newborn. First, I should like to say that the term "Rh factor" as originally used seems unsuitable for the designation of all the antigens now known to exist in association with it in man, and I think it better to use the term "Rh blood group" to cover this field. The term "Rh factor" might then be used to distinguish the original component common to man and the rhesus monkey. It seems rather inappropriate to designate as Rh factors red cell antigens which have not been demonstrated in the cells of rhesus monkeys.

## Discovery of the Rh Blood Group and its Clinical Significance

We owe our fundamental knowledge of the original Rh factor to the brilliant work of Landsteiner and Wiener (1941), who sought to extend knowledge of the complexities of agglutinogen M in man and other primates by studying the reactions of human and animal bloods with anti-rhesus sera prepared by the immunization of rabbits or guinea-pigs by the washed red cells of rhesus monkeys. The sera thus prepared were found to cause agglutination of the red cells of 85% of white persons, who were therefore designated rhesus-positive or Rh-positive for short, the remaining 15% being called Rh-negative. This startling discovery was soon followed by the significant announcement that the newly discovered antigenic properties of human red cells were the basis of intragroup transfusion reactions as the result of iso-immunization of Rh-negative recipients by previous transfusion of Rh-positive blood (Wiener and Peters, 1940).

Within a remarkably short space of time a further pronouncement of major clinical importance was made. Levine announced that the dreaded intragroup transfusion reactions of women in the puerperium were also the result of iso-immunization of Rh-negative women, and drew attention to the almost invariable association of such reactions to a first transfusion with death of the foetus or the occurrence of icterus gravis neonatorum. Levine and his co-workers (1941) brought forward irrefutable evidence that not only the liability of the mother to intragroup transfusion reactions but also the disease and death of the foetus were attributable to the iso-immunization of the mother by Rh antigens inherited by the foetus from an Rh-positive father. Somehow the antigen which the mother lacked had gained entrance to her circulation and had brought about iso-immunization with all its attendant troubles. These are the fundamental clinical facts about Rh incompatibility. Whatever advances have since been made or may be made in future, nothing can dim the brilliance of the achievements of our American colleagues, especially Wiener and Levine, in making these fundamental and fruitful observations.

Opportunities for iso-immunization of the pregnant woman by a foetal red cell antigen which she herself lacks is present in very many pregnancies—nearly 40% within the Rh group alone, according to Stancu, Clark, and Snyder (1947), but fortunately iso-immunization takes place only rarely. Clearly some red cell antigens are more effective immunizing agents than others, and also some women appear to be more readily immunized than others. Although the foetus has an A or B antigen which the mother lacks in about one-third of all pregnancies in this country, the ABO antigens only very rarely give rise to haemolytic disease of the foetus. None of the explanations of this freedom from ill effects in heterospecific pregnancy is wholly satisfactory, but clearly some potent protective mechanism must exist. There is also evidence that this protection is partially effective in preventing haemolytic disease due to coincident Rh incompatibility, for the incidence in heterospecific pregnacy is only about one-half of that found where the ABO groups of mother and foetus are compatible (Levine, 1943; Race, 1944; Wiener, 1945; Cappell, 1946). Transfusion of Rh-positive blood to an Rh-negative female before the first pregnancy has a very adverse effect and greatly increases the probability of haemolytic disease in the offspring, even if the transfusion has been given many years previously.

During the past year the Glasgow and West of Scotland Blood Transfusion Service under Dr. J. Wallace and Mr. Milne, to whom I am indebted for these figures, has examined the blood of approximately 25,000 women from the antenatal clinics of the area; among these were 4,540 Rh-negative women, 56 of whom were proved to have Rh antibodies, and in addition two Rh-positive women were found to be immunized and to have anti-E agglutinins of low titre. No fewer than 28 of the 56 Rh-negative mothers belonged to Group A and only 18 to Group O, a striking reversal of the A/O ratio for Scotland (Cappell, 1947b). Twenty-five of the fathers were examined and an equally striking disproportion in the opposite direction was found, only five out of 25 being of Group A and 15 out of 25 of Group O. These figures are consistent with previous findings that heterospecific pregnancy appears to confer some degree of protection against Rh sensitization.

*Read in opening a discussion in the Section of Pathology and Bacteriology at the Annual Meeting of the British Medical Association, Cambridge, 1948.

### Varieties of Haemolytic Disease

In the absence of previous transfusion with Rh-positive blood iso-immunization of the Rh-negative mother rarely occurs during the first pregnancy to an extent sufficient to produce haemolytic disease in the first-born, but the second or subsequent Rh-positive offspring may be affected. Contrary to expectation statistical analysis shows that in affected families the first recorded manifestation of the disease is usually one of the severer forms. When the haemolytic disease occurs in the second pregnancy it is more likely to take the form of icterus gravis or hydrops than congenital haemolytic anaemia, which is seen more often when the first affected child comes later in the family —e.g. the fifth or sixth. If icterus gravis appears first, it is likely to be more severe in the next affected child or it may be followed by hydrops. Only rarely, however, do the harmful effects begin with mild congenital anaemia and progress with increasing severity in successive pregnancies through icterus gravis to hydrops foetalis. This early occurrence of the severer forms of the disease seems to indicate a notably greater susceptibility to immunization on the part of some women ; thus cases with an early history of hydrops rarely show strong agglutinating antibodies but have usually developed blocking antibodies instead. Others may show strong agglutinating antibodies for some years, but in subsequent pregnancies blocking antibodies may appear (Cappell, 1947a, Case 4). Although we cannot predict with certainty the type of foetal disease from the type of antibody present, there is no doubt that the presence of blocking antibodies in high titre is a bad prognostic sign and is likely to be associated with premature death of the foetus or hydrops. In my own series of frank haemolytic disease cases with incomplete antibodies were about twice as numerous as cases with only agglutinins if we discount those in which agglutination occurred only in the first or second tube, where the protein concentration was high enough to lead to agglutinative effects with blocking antibodies (Wiener's conglutination reaction). Many of these earlier cases were studied before blocking antibodies were known, and their exact nature cannot now be ascertained. Sacks, Kuhns, and Jahn (1947) found among 12,140 unselected antenatal cases 96 Rh-negative sensitized mothers, of whom 65 had blocking antibodies alone, 23 had agglutinins alone, and eight had both types of antibody.

In Glasgow, however, among the above 56 Rh-negative sensitized women encountered in routine antenatal studies 33 showed anti-Rh agglutinins in a titre of 1 in 4 or more, while 23 showed blocking antibodies or a mixture of both types. The number of Rh-negative women showing sensitization is small, only about 1 in 80, but the antenatal clinics have an excess of primigravidae, who would be expected to produce infants free from haemolytic disease. Dr. Sandison, director of the East of Scotland Blood Transfusion Service, Dundee, has kindly supplied me with her recent figures showing that among 35 cases 23 had agglutinins of a titre greater than 1 in 4 and 12 had only blocking antibodies.

### The Antigenic Structure of the Rh Group

The Rh group consists of eight principal Rh types, but there is evidence that variants of these types occur. Four of the principal Rh types are Rh-positive and four are Rh-negative. These types have been recognized by the reactions of the red cells with four different antisera, from which it is clear that each Rh type consists of three elementary antigens selected from three allelomorphic pairs. The true complexity of Rh antigenic structure was first recognized by the brilliant analysis and synthesis of R. A. Fisher, who recognized that the reactions of red cells with two of the four antisera were antithetical and supposed that they distinguished allelomorphic antigens, which he called C and c. Since the reactions of the other two sera were not antithetical he supposed that they too reacted with elementary antigens and that each had an allele : these he named D or d, and E or e. Each Rh type was thus seen to be composed of three elementary antigens determined by three closely linked genes on the Rh chromosome. The Rh types may thus be represented either by Wiener's shorthand notation such as $R_1$ $R_2$ $R_0$ $R_z$, r′ r″ $r_y$ and r or by Fisher's more precise terminology using the CDE notation. As a result of the gradual advance in knowledge Wiener has had to admit that the Rh types consist of three elementary antigens, but he prefers to use a somewhat cumbersome terminology in which the c d e antigens are designated hr′ $Hr_0$ hr″. Wiener thus distinguishes four Rh types, four rh types, and three Hr types, but the relationships of these are not self-evident. I do not think we need concern ourselves here with controversies about nomenclature, but it is important to emphasize that whatever they may be called all writers recognize that each Rh type is made up of this antigenically complex pattern.

*Comparison of Rh Nomenclature*

| Wiener's Short Notation | Wiener's Full Notation | Fisher's Notation | |
|---|---|---|---|
| $R_0$ | hr′ $Rh_0$ hr″ | cDe | Rh-positive |
| $R_1$ or $R^{01}$ | rh′ $Rh_0$ hr″ | CDe | |
| $R_2$ or $R^{02}$ | hr′ $Rh_0$ rh″ | cDE | |
| $R_z$ or $R^{012}$ | rh′ $Rh_0$ rh″ | CDE | |
| r′ | rh′ $Hr_0$ hr″ | Cde | Rh-negative |
| r″ | hr′ $Hr_0$ rh″ | cdE | |
| $r_y$ or r′ ″ | rh′ $Hr_0$ rh″ | CdE | |
| r | hr′ $Hr_0$ hr″ | cde | |

### Criteria of Rh-positive or Rh-negative

In the assessment of the Rh group of the mother and family all individuals who lack the Rh antigen detected by the original anti-rhesus immune sera (Fisher's antigen D) should be reckoned as Rh-negative (Cappell, 1944, 1945) because such persons are liable to become immunized on suitable exposure to antigen D irrespective of whether they exhibit one or other of the associated antigens which were revealed later in man—i.e., Fisher's antigens C and E. The C and E antigens occasionally give rise to iso-immunization, especially when associated with D, but only very rarely give rise to trouble by themselves. Their presence in the mother's genotype, however, does not in any way protect her against immunization by the common Rh antigen D, and several such instances have been reported as examples of haemolytic disease in the offspring of Rh-positive mothers. It must be strongly emphasized that persons of such genotype as Cde/cde (r′r) or cdE/cde (r″r) are Rh-negative, and most of the more experienced workers have since agreed with me on this mode of classification (Cappell, 1944 ; 1945).

The Rh antigens C, D, and E are quite distinct immunologically from their alleles c, d, and e and also from one another. Each is capable of absorbing the homologous antibody from naturally occurring or artificial mixtures of Rh antibodies. It has, however, recently been found that the elementary antigens designated C, c, D, and E are not identical in all persons, and that the antisera to which they give rise are not of uniform reactivity. This lack of homogeneity was first clearly defined by Callender and Race (1946) in their recognition of the variant of C known as $C^W$ by means of an iso-immune serum derived from a transfusion reaction, and more recently $C^W$ has been found also to give rise to iso-immunization in pregnancy (Lawler and Van Loghem, 1947). Race, Sanger, and Lawler (1948) have reported a series of alleles at the C locus of which two are variants of C—namely, $C^W$ and $C^U$—and one is

variant of c—namely, $c^V$. The state of affairs at the D locus is similar. Stratton (1946) first recognized a different type of D antigen—$D^U$—by the observation that the cells in question failed to react with certain anti-D sera which were powerful against most D-containing cells. Race and his co-workers (1948b) have extended these observations and have shown that there are more than two types of D. By titration methods they have found that anti-D sera can be arranged in a certain order of reactivity, some sera agglutinating nearly all D cells while others fail to react with certain samples which are nevertheless readily sensitized by blocking anti-D sera, and are thus presumed to contain an antigen of the D class. Dr. Butler and I have observed at least two variants of D, one of which we detected in the cells of three out of 15 West African negroes. Such variants of D are probably attributable to the so-called intermediate genes which Wiener has reported among American negroes.

### The Inheritance of the Rh Group

The Rh, like other blood groups, is inherited on Mendelian principles, the genes being carried by a chromosome pair different from those carrying all the other known blood groups. There are therefore three classes of persons, the homozygous Rh-positives (RhRh), the heterozygous Rh-positives (Rhrh), and the homozygous Rh-negatives (rhrh). The prognosis in any family in which haemolytic disease has appeared depends largely on whether the father is *homozygous*, when all his subsequent children are likely to be affected, or *heterozygous*, when one-half of the offspring are likely to be Rh-negative and thus escape harm. There are a few recorded instances of the Rh-positive child of an immunized Rh-negative mother remaining unaffected by haemolytic disease, but in some of the published cases the genotyping of the child is insufficiently detailed to prove that antigen D was present, and some such children have been r′ (Cde) or r″ (cdE) and thus wrongly reckoned as Rh-positive. The use of Rh antisera containing two agglutinins—anti-C+D and anti-D+E (Wiener's anti-$Rh_1$ and anti-$Rh_2$)—for testing the baby's cells can easily lead to the wrong classification of infants as Rh-positives when in fact the positive reaction is due merely to the presence of antigen C or E. In some families Rh antibodies may appear in the mother and may even cause the infant's cells to give a positive direct reaction with Coombs's test, yet the child may remain clinically well or show only a trace of jaundice or anaemia. It is thus difficult to say on serological grounds that a child is unaffected if in fact its cells are sensitized, but no doubt the clinicians would be disinclined to accept such mild effects as examples of haemolytic disease. A discrepancy between laboratory and clinical findings may thus appear, but it will often be found in such families that subsequent Rh-positive children are affected beyond any clinical doubt, and this phenomenon may be merely evidence of commencing sensitization.

*Example 1.*—The difference in the prognosis with a homozygous father as compared with a heterozygous father is shown in the following family history.

Two Rh-negative sisters (rhrh) married Rh-positive men related as uncle and nephew. Both became immunized by three Rh-positive pregnancies, and haemolytic disease appeared in the third Rh-positive child. One man was homozygous RhRh, with the result that the fourth, fifth, and sixth pregnancies resulted in stillbirths, whereas the other man was heterozygous Rhrh, and his family of seven consisted of two Rh-negative children, a normal Rh-positive child, a second healthy Rh-positive child, two Rh-negative children, but the seventh pregnancy was again Rh-positive and resulted in haemolytic disease.

*Example 2.*—The late development of iso-immunization is shown in the following case, for details of which I am indebted to Dr. Sandison.

Mrs. D., group A, Rh-negative, had a family of 17 children, 15 of whom are alive and well—four are known to be Rh-negative and eight are Rh-positive. Recently an 18th child was apparently normal at birth, but its cells were strongly sensitized to Coombs's direct test; jaundice did not develop, and the child remained well, but by the 20th day its haemoglobin had fallen to 73%. The mother's serum contained only blocking antibodies.

*Example 3.*—Late sensitization, perhaps induced by transfusion.

Mrs. P., group O, Rh-negative, had seven normal children but received a blood transfusion in 1940 on account of haemorrhage after the birth of the seventh child. Four years later an eighth pregnancy terminated in a full-term male child who developed icterus gravis but recovered after transfusion of Rh-negative blood. The mother's serum contained blocking antibodies.

*Example 4.*—This family was important in our early work, as it was our first indication that there were different kinds of anti-Rh sera and that the Rh factor was more complex than had been realized; it also illustrates that Rh-negative women of genotype Cde/cde may become immunized against D.

Mrs. H., after losing her second and third children from icterus gravis, gave birth to a normal male child whose cells were agglutinated by some anti-Rh sera but not by others. Her serum contained a moderate amount of agglutinating anti-D, which reacted with the cells of her husband and first child but not with the cells of the fourth child. Later, the fifth and sixth children were also unaffected and proved to be Rh-negative cde/cde. The mother herself and the fourth child are of type Cde/cde (r′r) and thus might have been called Rh-positive by some observers.

The better understanding of the pathogenesis of haemolytic disease has not as yet yielded any notable advance in prophylaxis, and no effective means has been found either to prevent iso-immunization of Rh-negative women by Rh-positive foetuses or to render the effects of Rh antibodies less harmful. Kariher (1947) has reported that three sensitized women who had previously lost children from haemolytic disease were treated with repeated intramuscular injections of ethylene disulphonate in homoeopathic doses during a subsequent pregnancy. Their antibody titres fell markedly and each gave birth to a living Rh-positive child; two were unaffected and the third recovered under treatment. Confirmation of such interesting results is highly desirable.

### Cerebral Damage

Hydrops foetalis is usually regarded as universally fatal, but I understand that Diamond has obtained a few survivors from the mild form after treatment by replacement transfusion. Icterus gravis neonatorum has a high mortality if untreated, but the use of Rh-negative blood for transfusion of the newborn infant has greatly improved the prognosis. Some very experienced workers, however, have expressed doubts about the value of treatment on account of the risk of cerebral damage (nuclear jaundice) and the chances of prolonging the lives of infants who are hopelessly crippled mentally or physically. I have thought it worth while therefore to report the late results of cases treated by Dr. McFarlane and me before 1945 and of others subsequently treated by Dr. Sandison, to whom I am indebted also for the results of the follow-up.

We have been able to re-examine 30 infants treated by transfusion of Rh-negative blood immediately after birth or mainly within the first 12 hours; all are normally developed physically and mentally, and not a single child shows evidence of backwardness. In comparison I am indebted to my colleagues of the Royal Hospital for Sick

Children, Glasgow, and particularly to Dr. R. R. Gordon, for the information that in a follow-up of a larger series of cases of icterus gravis admitted to that institution between 1934 and 1944 and treated mainly at a later stage by transfusion of blood not selected for Rh factor about 12% showed some residual nervous sequelae, such as general backwardness, a figure in close agreement with those given by Parsons (1947). Dr. G. L. Montgomery, pathologist to the Royal Hospital for Sick Children, Glasgow, informs me that during the same period the incidence of nuclear jaundice in fatal cases of icterus gravis was about 30%, a frequency notably higher than that of clinical signs of nervous involvement.

There is no doubt that nuclear jaundice may be unsuspected clinically in cases dying within the first few days. I am not convinced that the cerebral damage which results in nuclear jaundice occurs before birth, its incidence is so irregular and so poorly correlated with the amount or type of antibodies or the intensity of jaundice or anaemia that one is driven to speculate about other possible factors. In some cases observed personally I have been impressed with the difficulty in establishing respiration after birth, and perhaps anoxaemia in the immediately post-natal period may be a determining factor. While one must agree with Parsons (1946, 1947) that it is useless to prolong the life of the child known to be afflicted with nuclear jaundice, I am more optimistic than he, and I am hopeful that it may be possible at least to reduce the incidence of nervous sequelae by prompt and efficient treatment. Whether immediate replacement transfusion is the method of choice for this purpose, as Wallerstein (1946) and Wiener, Wexler, and Grundfast (1947) claim, can be decided only when a large series of cases has been treated by this technique.

In my opinion there is no evidence to suggest that Rh incompatibility between mother and child will itself lead to mental deficiency. General mental backwardness may result from damage to the cerebral cortex in those who have suffered from icterus gravis in the neonatal period, and if the basal nuclei have been severely damaged motor disturbances are very likely to follow in the survivors. The view of Yannet and Lieberman (1946) that mental deficiency occurs as the sole clinical manifestation of Rh incompatibility has not been borne out by subsequent studies (Scholl, Wheeler, and Snyder, 1947; Cappell, 1947a).

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# PRELIMINARY NOTE ON INFLUENCE OF HETEROSPECIFIC IMMUNIZATION ON PRODUCTION OF Rh ANTIBODIES


BY

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In a previous paper (van Loghem, 1947) we reported the results of artificial immunization of male volunteer donors by frequent injections of small quantities of R′ (Cde) and R″ (cdE) cells given intravenously in order to produce Rh agglutinins anti-C and anti-E. In two of the six volunteers the results were satisfactory. Rh agglutinins were formed in sufficient quantity to obtain useful Rh test sera. After the first experiments we were able gradually to extend the group of six male donors to 17. In general it takes a long time before the donors react with the formation of antibodies after repeated injections, and many of them do not react at all on the intravenous administration of these weak antigens (C, D, and E). Therefore we tried the influence of heterospecific immunization on the production of Rh antibodies.

It is a well-known fact that immunization with variola vaccine, typhoid vaccine, and many other vaccines may increase the titre of iso-agglutinins $\alpha$ or $\beta$.* We tried this time to stimulate the production of Rh antibodies by simultaneous injections of two or three other antigens as well as the Rh antigens, where Rh antigens alone failed to act after prolonged administration. The vaccines used for this purpose were triplovaccine (1,000 million typhoid bacteria, 500 million paratyphoid A bacteria, and 500 million paratyphoid B bacteria per ml.) and tetravaccine (5,000 million cholera bacteria, 500 million typhoid bacteria, 500 million paratyphoid A bacteria, and 500 million paratyphoid B bacteria per ml.).

The donors selected for this purpose had already received many injections, varying from 15 to 42 in number, without producing Rh antibodies. Their sera were investigated at regular intervals by the saline and albumin methods.

## Donor H. B.

H. B., aged 40, blood group A rr (cde/cde), had already received 42 injections, each of 1 ml. of a 25% red-cell suspension. The cells used for this purpose were type A R$_1$r (cDe/cde), always derived from the same donor (see Table I). The injections were given intravenously mostly twice a week during a period of seven months, with three periods of rest varying from one month to eleven days.

When we started the administration of typhoid vaccine no Rh antibodies (early-immune or hyperimmune) were demonstrable in his serum. Triplovaccine was given three times intramuscularly at seven-day intervals in quantities of 0.5 ml., 1 ml., and 1 ml., but without results. After another nine injections with

*Other arguments for the influence on the production of heterospecific antibodies by injection of heterospecific antigens were communicated: (1) by Hoet (1947), who suggested that in cases of erythroblastosis foetalis, in which the mother received previous to the Rh immunization by pregnancy injections of diphtheria, tetanus, or other vaccine, the mortality rate of the newborn increased; (2) by Pondman (1947), who reported that the production of antidiphtheritic serum in horses was stimulated by injections of a heterospecific antigen—tapioca; and (3) by our personal investigations (van Loghem and Spoaander, 1948) which proved that ABO incompatibility in cases of Rh antagonism has an unfavourable influence on the clinical aspect of erythroblastosis foetalis.

TABLE I.—*Donor H.B. (Blood Group A rr)*

| Date | No. of Inj. | Quantity of A $R_o$ Cells given I.V. (ml.) | Rh Antibodies | | Quantity of Triplo-vaccine given I.M. (ml.) | Quantity of Tetra-vaccine given I.M. (ml.) | |
|---|---|---|---|---|---|---|---|
| | | | Early-immune | Hyper-immune | | | |
| | | | D | D | | | |
| 20/11/47 | 43 | 1 | | | 0·5 | | |
| 27/11/47 | 45 | 1 | | | 1·0 | | |
| 4/12/47 | 47 | 1 | | | 1·0 | | |
| 15/1/48 | 52 | 1 | | | | 0·5 | |
| 19/1/48 | 53 | 1 | | | 0·5 | | |
| 22/1/48 | 54 | 1 | | | | 0·5 | |
| 26/1/48 | 55 | 1 | | | 0·5 | | Temp. |
| 30/1/48 | 57 | 1 | 1 : 2 | 1 : 4 | | 1·0 | |
| 2/2/48 | 58 | 1 | | | 1·0 | | |
| 5/2/48 | 59 | 1 | 1 : 2 | 1 : 4 | | | |
| 9/2/48 | 60 | 1 | 1 : 2 | 1 : 2 | | | |
| 19/2/48 | 62 | 1 | 1 : 2 | 1 : 2 | | | |

1 ml. of 25% $R_o$ cells, tetravaccine was given. Following the second injection of 0.5 ml. of tetravaccine, given one week after the first, clinical symptoms of sickness and rise of temperature resulted and lasted for two days.

Five days after the latest injection with tetravaccine the serum for the first time contained Rh antibodies type anti-D in low titre (1:4). Another injection with 1 ml. of tetravaccine seven days later did not further increase the titre of Rh antibodies, although frequent injections of $R_o$ cells were also given.

## Donor W. E.

Approximately the same procedure was followed with the male donor W. E., aged 19, blood group A rr (see Table II).

TABLE II.—*Donor W.E. (Blood Group A rr)*

| Date | No. of Inj. | Quantity of $R^1$ Cells given I.V. (ml.) | Rh Antibodies | | | | Quantity of Triplo-vaccine given I.M. (ml.) | Quantity of Tetra-vaccine given I.M. (ml.) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Early-immune | | Hyper-immune | | | | |
| | | | C | D | C | D | | | |
| 21/11/47 | 16 | 1 | | | | | 0·5 | | |
| 27/11/47 | 18 | 1 | | | | | 1·0 | | Temp. |
| 4/12/47 | 20 | 1 | | | | | 1·0 | | |
| 15/12/47 | 23 | 1 | 1 : 1 | — | 1 : 2 | — | | | |
| 18/12/47 | 24 | 1 | 1 : 4 | — | 1 : 4 | — | | | |
| 23/12/47 | 25 | 1 | 1 : 8 | — | 1 : 8 | | | | |
| 15/1/48 | 29 | 1 | | | | | | 0·5 | |
| 19/1/48 | 30 | 1 | 1 : 8 | — | 1 : 8 | — | | | |
| 22/1/48 | 31 | 1 | | | | | | 1·0 | |
| 29/1/48 | 33 | 1 | | | | | | 1·0 | |
| 1/2/48 | 34 | 1 | 1 : 32 | — | 1 : 32 | — | | | |
| 19/2/48 | 37 | 1 | 1 : 4 | — | 1 : 4 | — | | | |
| 8/3/48 | 40 | 1 | 1 : 4 | — | 1 : 16 | | | | |

Before the heterospecific immunization he had received only 15 injections of R′ cells of two different donors: Dam. O R′r (Cde/cde) and Mor. A R′r (Cde/cde). Up to this time no Rh antibodies had been formed. The cells of Dam. should more properly be called $CD^ue$/cde. This was elucidated by Dr. Race. The finding of some anti-D besides anti-C in the serum of other Rh-negative donors injected with these cells was explained by Dr. Race by the presence of the $D^u$ antigen in the cells of Dam.

The first injection of 0.5 ml. of triplovaccine gave no results. The second injection of 1 ml. was followed by a rise of temperature and a feeling of sickness. After another week the administration was repeated. Ten days later the serum was investigated, and Rh antibodies; type anti-C, were present in a low titre (1:2). After repeated injections with R′ cells the titre increased, but only to 1:8; happily no anti-D (early-immune and hyperimmune) was formed, which could have been the result of the presence of the $D^u$ antigen in the red cells of donor Dam.

In an attempt to raise the titre further by injections of stronger antigens, tetravaccine was given on the same day as the 29th injection of R′ cells. After three injections of tetravaccine at weekly intervals the titre increased to 1:32—pure anti-C agglutinins without anti-D (early-immune or hyperimmune). A few days later 1 litre of the donor's blood was replaced by 1 litre of Rh-negative blood. After absorption with B rr blood, the titre fell to only 1:16. The serum is very useful as Rh test serum. After further injections with R′ cells the titre of anti-C agglutinin decreased and only some hyperimmune anti-C was formed.

## Donor G. de J.

This case is probably still more interesting. Male donor G. de J., aged 33, blood group A rr, from March 11 to Sept. 22, 1947, received 32 injections of 0.25 ml. of R′ cells of the two donors Dam. and Sch. The cells of Dam. are O $CD^ue$/cde and of Sch. O Cde/Cde. After 17 injections at regular intervals anti-C agglutinins, titre 1:8, and hyperimmune anti-D, due to the presence of $D^u$ antigen, were formed.

It is remarkable that early-immune antibodies (agglutinins), type anti-D, could never be demonstrated in his serum. The generally accepted and proved theory of Diamond that hyperimmune antibodies are formed only after the production of early-immune antibodies by prolonged immunization seems not always to be true. After 14 other injections the titre of anti-C agglutinins decreased to 1:4, but that of the hyperimmune form increased to 1:32.

After four months' rest agglutinins type anti-C were no longer present in the serum of this donor, and the hyperimmune antibodies anti-C and anti-D reappeared only in a very poor titre of 1:2 and 1:1 after one injection with R′ cells. We then tried the influence of heterospecific immunization: 0.5 ml. of tetravaccine was given intramuscularly. The donor reacted with a feeling of sickness and a rise of temperature (38.6° C.) lasting nearly two days. In the same week he received two injections with R′ cells. The anti-C agglutinins reappeared in his serum, especially the hyperimmune form anti-C, which increased rapidly. As will be seen from Table III a second injection of

TABLE III.—*Donor G. de J. (Blood Group A rr)*

| Date | No. of Inj. | Quantity of O $R^1$ Cells given I.V. (ml.) | Rh Antibodies | | | | Quantity of Tetra-vaccine given I.M. (ml.) | |
|---|---|---|---|---|---|---|---|---|
| | | | Early-immune | | Hyper-immune | | | |
| | | | C | D | C | D | | |
| 5/6/47 | 13 | 0·25 | 1 : 2 | | | | | |
| 19/6/47 | 17 | 0·25 | 1 : 8 | | — | 1 : 8 | | |
| 29/8/47 | 28 | 0·25 | 1 : 4 | | 1 : 16 | | | |
| 22/9/47 | 32 | 0·25 | 1 : 4 | | 1 : 32 | 1 : 8 | | |
| 30/3/48 | 33 | 0·25 | — | | 1 : 2 | 1 : 1 | | |
| 5/4/48 | 34 | 0·25 | | | | | 0·5 | Temp. |
| 8/4/48 | 35 | 0·25 | 1 : 8 | | 1 : 64 | 1 : 8 | | Temp. |
| 11/4/48 | 36 | 0·25 | 1 : 16 | | 1 : 256 | 1 : 16 | 1·0 | |
| 15/4/48 | 37 | 0·25 | 1 : 32 | | 1 : 512 | 1 : 32 | | |

tetravaccine and two additional injections with R′ cells increased the titre of anti-C agglutinins to 1:32, the hyperimmune antibody anti-C to 1:512, and the hyperimmune anti-D to 1:32.

## Discussion

From these three cases we may conclude that *it is possible to stimulate, even to provoke, the production of Rh antibodies by heterospecific antigens* after a shorter or longer course with the specific Rh antigens. This procedure is not successful in all cases. One of our first donors produced pure anti-E agglutinins (titre 1 : 64) after repeated injections with R″ cells. Later on the titre fell in spite of many injections with the same cells and a few short periods of rest. Neither could we observe any success after repeated injections with tetravaccine. It seems that after too many injections a certain insensibility appears. It is therefore necessary to prevent overdosage.

In Table IV the final results of immunization of the 17 donors are collected—14 received tetravaccine after a longer or shorter period of Rh immunization. We have already stated that only three of them produced Rh antibodies. They all showed *clinical signs of sickness and a rise of temperature*. In all the other cases the clinical manifestations were absent or very slight. In two other donors Rh

TABLE IV.—*Final Results of Immunization*

| No. | Donor | Total No. of Inj. | Cells | Total No. Triplo. Inj. | Total No. Tetra. Inj. | Inj. of Porc's Serum | Rh Antibodies | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Early-immune | | | | Hyperimmune | | | |
| | | | | | | | C | D | E | c | C | D | E | c |
| 1 | F. J. A. .. .. | 31 | R′ | 3 | 3 | — | — | — | | | — | — | | |
| 2 | W. E. .. .. | 34 | R′ | 3 | 3 | — | 1 : 8 | | | | 1 : 16 | | | |
| 3 | G. de J. .. .. | 17 | R′ | — | 2 | — | 1 : 32 | | | | 1 : 512 | 1 : 32 | | |
| 4 | P. F. .. .. | 36 | R′ | 3 | 3 | 1 | — | — | | | — | — | | |
| 5 | B. R. .. .. | 21 | R′ | — | 1 | — | — | — | | | — | — | | |
| 6 | A. v. S. .. .. | 35 | R′ | — | — | — | — | — | | | — | — | | |
| 7 | W. W. .. .. | 22 | R′ | — | 3 | — | — | — | | | — | — | | |
| 8 | J. H. W. .. .. | 27 | R′ | — | 3 | — | — | — | | | — | — | | |
| 9 | J. Th. W. .. .. | 25 | R′ | — | 3 | — | — | — | | | — | — | | |
| 10 | A. P. W. .. .. | 21 | R′ | — | 3 | — | — | — | | | — | — | | |
| 11 | H. B. .. .. | 59 | $R_o$ | 3 | 3 | — | | 1 : 2 | | | | 1 : 4 | | |
| 12 | P. E. .. .. | 33 | R″ | 3 | 3 | — | | — | — | | | — | — | |
| 13 | F. K. .. .. | 18 | R″ | — | | — | | | 1 : 64 | | | | | |
| 14 | P. A. M. .. .. | 34 | R″ | 3 | 3 | — | | — | — | | | — | — | |
| 15 | G. J. R. .. .. | 50 | R″ | 3 | 3 | 1 | | — | — | | | — | — | |
| 16 | H. V. .. .. | 31 | R″ | — | 3 | — | | — | — | | | — | — | |
| 17 | H. S. .. .. | 15 | rr | — | — | — | | | | — | | | | — |

The blood of all these donors was type rr, except H. S. (No. 17) which was R $R_1$.

antibodies were formed after immunization with Rh cells only, but in one of these a strong increase of titre was obtained only after administration of tetravaccine.

In all, four (23%) of the 17 donors produced Rh antibodies—1 anti-E, 2 anti-C, and 1 anti-D. The sera derived from the first three persons were very useful as Rh test sera anti-C and anti-E.

As is shown by the above-mentioned findings it is especially those individuals who show clinical reactions to the application of triplovaccine and tetravaccine who are apt to form Rh antibodies. This was also confirmed by the serological results concerning the formation of agglutinins against typhoid and paratyphoid A and B antigens O and H.

As will be seen from Table V only those donors who produced antibodies against nearly all the injected typhoid antigens showed clinical symptoms of sickness and produced Rh antibodies. None of the donors reacted to the administration of cholera vaccine. This may be explained by the fact that this cholera vaccine must be a very poor antigen.

TABLE V.—*Serological Reactions after Triplovaccine and Tetravaccine Injections*

| Nos. referring to Table IV | Donor | Ty H | Ty O | PA H | PA O | PB H | PB O | Cholera |
|---|---|---|---|---|---|---|---|---|
| 12 | P. E. | 1 : 250 | — | — | — | — | — | — |
| 7 | W. W. | — | — | — | — | 1 : 500 | — | — |
| 10 | A. P. W. | — | — | — | — | 1 : 1000 | — | — |
| 4 | P. F. | 1 : 100 | — | — | 1 : 250 | — | — | — |
| 13 | F. K. | — | — | — | — | 1 : 1000 | — | — |
| 1 | F. J. A. | — | — | — | — | 1 : 250 | — | — |
| 9 | J. Th. W. | 1 : 50 | 1 : 100 | — | — | 1 : 500 | 1 : 100 | — |
| 16 | H. V. | — | — | 1 : 50 | — | 1 : 1000 | — | — |
| 11 | H. B. | 1 : 250 | 1 : 100 | 1 : 100 | — | 1 : 100 | 1 : 50 | — |
| 2 | W. E. | — | 1 : 100 | — | 1 : 250 | 1 : 250 | 1 : 100 | — |
| 3 | G. de J.* | 1 : 50 | 1 : 50 | — | — | 1 : 100 | 1 : 50 | — |

* Before vaccination only Ty O was present 1 : 50.

From these results it may be concluded that it is possible to change the procedure in a simple way—that is, to choose donors by injecting them with triplovaccine or tetravaccine. Only those who react clinically as well as serologically to the administration of vaccines will be selected for the immunization procedure.

Recently we started investigations with another group of volunteers (from a convent). Three nuns were injected with $C^w$ antigen, and one of them formed a pure $C^w$ antibody of the hyperimmune form after 20 injections administered over a period of three and a half months with a titre of 1 : 8.


## Summary

About 23% of Rh-negative male donors produced type-specific Rh agglutinins, some of them with titres high enough for useful Rh test serum after heterospecific immunization.

It is necessary to exclude the presence of weak antigens ($D^u$ and others) in order to prevent the formation of unwanted antibodies (anti-D).

It was proved in most cases that the occurrence of decrease in titre of early-immune antibodies anti-C or anti-E was followed by increasing titre of the hyperimmune form. In one case an exception was found: hyperimmune antibodies were formed without preceding formation of early-immune antibodies.

The production of Rh antibodies is stimulated or even provoked by the administration of bacterial antigens.

In general only those persons who reacted clinically and serologically to the administration of triplovaccine and tetravaccine produced Rh antibodies.


We are very grateful to Professor Dr. A. Charlotte Ruys, who kindly investigated the sera of the donors for typhoid agglutinins.

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Unesco has announced the formation of an international agency to aid children's villages, which are now operating in over twelve European countries for the care of war orphans. The agency has been named the International Federation of Children's Communities. This organization will co-ordinate community activities, sponsor psychological research, train personnel, raise funds, and maintain contact with Unesco, the International Children's Emergency Fund, and international voluntary agencies interested in child welfare. The federation will be served by an international co-ordinating committee and secretariat, with headquarters at Trogen. Committee members include Dr. Préaut, director of the Hameau Ecole, Ile-de-France; Professor Ernesto Codignola, director of the Scuola-Citta Pestalozzi, Florence, Italy; Mr. Arthur Bill, educational director of the Pestalozzi Village, Trogen, Switzerland; Mr. René de Cooman, president of the Marcinelle Children's Village, Charleroi, Belgium; and M. Henri Julien, director of the République d'Enfants, Moulin-Vieux, France. Two places have been left open for village directors from Eastern European countries. Dr. Préaut has appealed for world-wide support for the villages so that the many thousands of war orphans may be restored to physical and mental health. The agency is setting up centres in Europe and America to receive funds and much-needed equipment. This includes books and other school supplies, sports gear, model toys, cinema cameras and projectors, laboratory supplies, and equipment for raising food on the village farms. Information about the receiving centres may be obtained from Unesco's Reconstruction Department, 19, Avenue Kléber, Paris 16; or from the Commission for International Educational Reconstruction, 744, Jackson Place, N.W., Washington, 6.

# HOW IMPORTANT IS TRANSFUSION AS A CAUSE OF HAEMOLYTIC DISEASE OF THE NEWBORN?

BY

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When transfusion reactions caused by the Rh factor were first recognized (Wiener and Peters, 1940) it was thought that sensitization by transfusion was rare, though once it had developed following repeated pregnancy small transfusions would increase the antibody titre. Attention was therefore directed to the peculiarities of those patients who formed antibodies, and it was thought that subjects suffering from certain diseases (Drummond *et al.*, 1945; Callendar and Paykoc, 1946) were especially apt to produce antibodies to antigens which they lacked. Studies on soldiers transfused during the invasion of Europe led to a change of opinion, Moloney (1945), Hattersley (1947), and Diamond (personal communication, 1947) showing that at least 55% of Rh-negative* males were sensitized by a single transfusion of Rh-positive* blood, while Wiener and Gordon (1947) sensitized five out of nine volunteers, obtaining high titres in two.

Since Levine and others (1941a, 1941b) had shown that haemolytic disease of the newborn is caused by a reaction between a foetal antigen and the corresponding antibody formed by the mother, and that in about nine-tenths of all cases the antigen concerned is the Rh antigen, it becomes important to decide what part transfusion plays in the pathogenesis of haemolytic disease of the newborn. Various authors have noted that transfusion occasionally preceded and apparently caused fatal cases of disease in a first-born child, but Hellmann (1947) studied 27 Rh-negative mothers who had given birth to affected infants and found that seven had been transfused with blood of unknown Rh type before the birth of the first affected infant, whereas only 2% of the generality of mothers had been transfused.

## Present Investigation

To compare with these results, the notes of Rh-negative mothers of affected infants born or treated in this hospital were reviewed. The mild cases not clinically distinguishable from "physiological jaundice" were rejected, as were those due apparently to ABO compatibility, but two cases without serological data were retained—these mothers had never received a transfusion. Mothers who had received only Rh-negative blood were classed as "not transfused." Those patients whose hospital notes were not explicit were written to, and all replied. The results are given in Table I, together with the replies of 200 consecutive mothers attending the antenatal clinic, who are described as "unselected." In Table II is shown the mortality of the infants in the two groups into which the mothers of affected infants are placed.

The frequency of transfusion with blood which had not been Rh grouped is therefore 36% among the mothers of infants affected by haemolytic disease of the newborn, compared with 2% among the general population of the clinic. These results could be explained by either of two hypotheses; first, that mothers who gave birth to infants affected by haemolytic disease are particularly liable to illness which requires transfusion—a hypothesis for which there is no evidence whatsoever; or secondly that transfusion sensitizes the recipient and thus prepares the way for the development of haemolytic disease—a view for which there is plenty of support.

This risk has been recognized for over a year at this hospital, and the Gunz (1946) transfusion form was modified to eliminate it (see accompanying Form). It is a rule that no female below the age of 40 years may be transfused unless she has been Rh tested, and if found to be negative she must receive Rh-negative blood. In the rare extreme emergency, when there is no time to test, or in emergency transfusions in domiciliary work, Rh-negative blood is used until the recipient has been tested and shown to be positive. This procedure has been made possible only by the adoption of Chown's (1944) capillary technique, which usually gives a clear-cut result within 10 minutes of setting up or 15 minutes of seeing the patient (Discombe and Meyer, 1948), and by the co-operation of the newspapers which serve the locality in advertising our need for donors.

It is well known that sensitization can be induced by a single injection of quite small quantities of an antigen. There is no reason why the Rh antigen should behave differently, so it must be assumed that injection of any volume of blood, from 0.1 ml. to 1,000 ml., should suffice to establish sensitization: the titre of antibody produced by a single injection will be low, but will rise rapidly if the antigen is again injected after a lapse even of years.

TABLE I.—*Comparison of Results*

| | Mothers of Affected Infants | Mothers Unselected | Total |
|---|---|---|---|
| Transfused .. .. | 9 | 4 | 13 |
| Not transfused .. | 16 | 196 | 212 |
| Total .. | 25 | 200 | 225 |

$\chi^2 = 41{\cdot}15$
$P = <0{\cdot}001$

TABLE II.—*Mortality of Infants Affected*

| Mothers | Infants | | |
|---|---|---|---|
| | Died | Survived | Total |
| Transfused .. .. | 5 | 4 | 9 |
| Not transfused .. | 9 | 9 | 18 |
| Total .. | 14 | 13 | 27 |

CENTRAL MIDDLESEX COUNTY HOSPITAL

**REQUEST FOR BLOOD FOR TRANSFUSION**

Patient's Name..... Sex.... Age.... Ward.....

Has patient had any previous transfusion? Yes No

If so, was it followed by a rigor or by jaundice? Yes No
Don't know

If the patient is female:
any pregnancies? Yes 1, 2, 3, 4, more No
any stillbirths? Yes No
any babies jaundiced at birth? Yes No

If previously determined in this Hospital, Group O A B AB
Rhesus Positive Negative

Transfusion will be Immediate Urgent When convenient

No. of pint bottles required 1 2 3 4
Ring the correct answer

Transfusion request form. On the reverse side are instructions for transfusion and space for the laboratory to note the ABO and Rh group and the serial number of bottles supplied.

*Throughout this paper Rh-positive refers to blood possessing the antigen D, and Rh-negative, in the case of recipients, refers to those lacking this antigen; in the case of donors, Rh-negative implies lack of the three major antigens, C, D, and E.

Since for many years the intramuscular injection of parental blood has been recommended for the treatment of haemorrhagic disease of the newborn, it appears useful to calculate the frequency with which this procedure might sensitize the infant to the Rh factor. Of the whole population, about 17% are Rh-negative (rr) and 45% heterozygous Rh-positive (Rr). Rh-negative infants can be born to Rh-positive parents in the matings Rr × rr, constituting 15.2%, and Rr × Rr, forming 19.8% of all matings. Therefore, in the first group three out of four and in the second group one out of four of all children will be Rh-negative, so that one or both parents are Rh-positive when the infant is Rh-negative in about 12.5% of all births. It seems that over 6% of all infants could be sensitized by the injection of parental blood.

If all infants were treated thus, about one in three of all Rh-negative females would be sensitized. Fortunately, haemorrhagic disease of the newborn is not common, but, even if it is rare, treatment by injection of parental blood will sometimes result in the appearance of haemolytic disease in the first-born of an Rh-negative mother. Such possible tragedies can be avoided by the use of a vitamin-K analogue, and the use of parental blood in its place will no doubt in future be regarded as a barbarous and unethical procedure.

### Conclusion

A history of having received a blood transfusion without special precautions for Rh matching is 18 times more common among mothers of infants suffering from haemolytic disease of the newborn than among unselected patients at the antenatal clinic.

Such transfusion probably causes the disease.

Injection of paternal or maternal blood into an infant without Rh matching would sensitize about one in three of the Rh-negative females at risk.

It is wrong to inject any female with blood from another individual unless either the recipient is known to be Rh-positive, both recipient and donor to be Rh-negative, or the recipient to be too old to bear children.

This rule must be broken only if the patient is expected to die before Rh-compatible blood can be obtained.

We wish to acknowledge our debt to the staff of the department of obstetrics for much valuable help and advice, and for permission to review large numbers of their case records.

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As the result of negotiations between the Northern Ireland Ministry of Health and the Northern Ireland Pharmaceutical Negotiating Committee, the Committee has decided to recommend all chemists in Northern Ireland to enter the Health Service provisionally, pending the outcome of further negotiations. The Minister of Health (said an agreed joint statement) "undertook to appoint a practising accountant to carry out an investigation into dispensing costs in Northern Ireland and, after receiving the Accountant's report, to enter into further negotiations on the basis of this report and that made by the accountants appointed by the chemists, full account to be taken of pharmaceutical practice in Northern Ireland."

## THE EVOLUTION OF GASTRIC AND DUODENAL ULCERATION

BY

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Acquired disease being the product of disharmony between constitutional and environmental factors, it is inevitable that alterations in mode of life should be accompanied by change in the pattern and distribution of certain diseases. As a preliminary to the present investigation the early literature dealing with peptic ulcer was reviewed and the observations thereon summarized in a previous communication (Craig, 1947). Space will not permit of further detailed discussion of the nature and incidence of peptic ulceration before the present century, but certain broad conclusions may be outlined.

Although gastric ulcer was mentioned by Celsus and was well recognized in the eighteenth century, the disease does not appear to have been at all common until the middle of the nineteenth century, when William Brinton (1857) concluded that about 5% of the population were subject to gastric ulcer at some time or other in their lives. At that time gastric ulcer was predominantly a disease of young women, many of whom suffered from perforation. Haematemesis occurred more commonly in men, generally in the fifth decade, but by the end of the century this complication, too, was one more often affecting young women (Hale White, 1901). Thus, although the overall incidence of gastric ulcer has remained fairly uniform during the past century, the age and sex distribution and its clinical pattern have changed very considerably in that time.

George Hamberger (1746) first described a case of duodenal ulcer, and Abercrombie (1828) gave the first account of the clinical features of the disease, but until the end of the century the amount of interest taken in the condition was out of all proportion to the number of cases encountered. The Fenwicks (1900), for example, were able to quote over 200 references, yet for all their extensive experience and keen interest they could gather together only 68 cases, 25 of them acute ulcers. It is generally believed that the apparent rarity of duodenal ulcer until the present century was the consequence of failure to recognize the condition. Undoubtedly many cases were missed, but when the situation is viewed against the broader background of earlier writings it is difficult to escape the conclusion that improvement in diagnosis was concomitant with an increase in the frequency of the disease. Review of more recent years provides strong evidence of further increase, and this suspicion becomes stronger. Although there is every reason to believe that duodenal ulcer has become very much more common there is no evidence that its clinical features have altered in any way.

Pringle (1753) and MacGregor (1804) in their treatises on military medicine made no mention of dyspepsia in the Army. In the war of 1914–18, digestive diseases of all types were no great problem, but in the recent war, by the end of 1941 no fewer than 23,754 serving personnel had to be invalided from the Army alone on account of peptic ulcer, duodenal ulcer preponderating over gastric ulcer in the ratio of approximately 7:2.

The changing nature and frequency of gastric and duodenal ulceration thus becomes apparent. The evolution of acute gastric ulcer, of chronic gastric ulcer, and of duodenal ulcer has been so different as to raise the strong suspicion that they may be distinct diseases, albeit related to one another. In an attempt to evaluate causal factors

it should not therefore be too readily assumed that gastric ulcer differs from duodenal ulcer only in its situation.

### Statistics of the Registrar-General

Tidy, by analysis of the statistics of the Registrar-General for the years 1911–37, has shown that the increase in the crude death rate from peptic ulcer during this period is accounted for largely by the increase in deaths from gastric ulcer in men over 40. He has also pointed out the rapid diminution in the number of deaths from gastric ulcer in women under the age of 40. Jennings (1940), in a comprehensive historical survey of perforated peptic ulceration, has stressed the changing age and sex distribution of this condition, with particular reference to the period 1901–35.

In this present review death rates in the civil population have been analysed in selected years, up to and including 1945. The difficulties inherent in the interpretation of these figures are manifold, and in the past have perhaps been insufficiently stressed. Acceptance of these statistics as accurate implies an assumption that the great majority of death certificates correctly assign the cause of death, and this is a bold surmise when dealing with two diseases—gastric and duodenal ulceration—which are so readily confused with one another and the latter of which was widely recognized only recently. Secondly, such statistics refer to only a small proportion of ulcer sufferers—some 5% or so—who die from the direct effects of their ulcers. Finally, in trying to assess disease trends, it is almost impossible to evaluate the effect of therapeutic changes.

From the year 1940 a change was made in the manner of selecting the assigned cause of death where more than one cause was mentioned in the death certificate, the choice then being "that in the main inferred from the statement of the certifier instead of being determined by arbitrary rules of precedence." This change had the effect of producing an apparent increase of about 4% in the mortality rate of peptic ulcer. If the crude death rate for all forms of peptic ulcer be plotted graphically for the years 1910–45 it will be noted that no very significant fluctuation occurred between the years 1911 and 1921, after which there was a very sharp and uninterrupted rise till 1927. From then until 1939 this rise was less marked and was interrupted by minor falls; but the year 1940 saw the sharpest rise hitherto recorded, the rate remaining at the same high level in 1941, falling back to its original level in 1942, and then rising steadily and fairly steeply till the year 1945. Only about one-fifth of the increase in 1940 could be accounted for by the new method of selecting the cause of death.

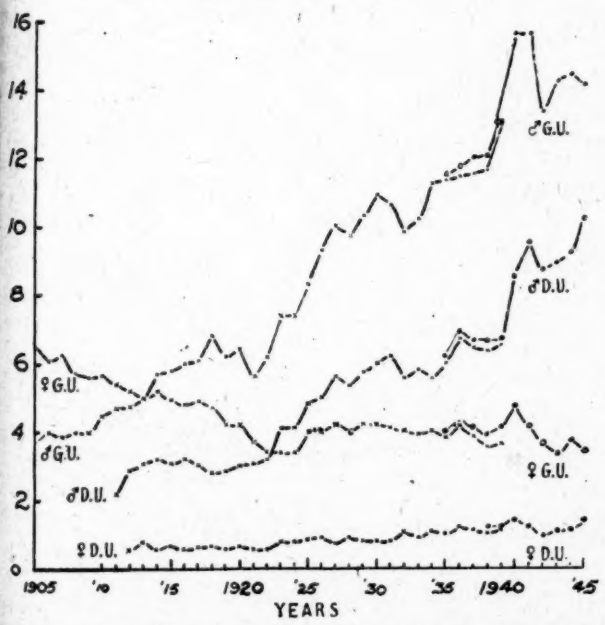


FIG. 1.—Crude death rates per 100,000 living for gastric ulcer and duodenal ulcer from 1905 to 1945. During the periods of the two world wars non-civilian figures are excluded. For the years 1935-9 inclusive the graphs show rates (*a*) based on the revised method of assignment (o-o-o) and (*b*) based on the old method of assignment (x-x-x).

In Fig. 1 the death rates from gastric ulcer and duodenal ulcer are plotted separately for the two sexes. From 1940 onwards the figures are based on the new method of assessment : before 1935 they are based on the old method. For the years 1935–9 inclusive two sets of figures are plotted—those based on the old method and those based on the new method. It will be seen that the change in the method of assigning the cause of death makes no significant alteration to the general trend. The increased mortality rate is accounted for largely by the increased death rate from gastric ulcer in males and to a smaller extent from duodenal ulcer in males. Although duodenal ulcer in females has been a steadily increasing cause of death the mortality rate from gastric ulcer in women has fallen fairly steadily and uninterruptedly, with the exception of the year 1940, when there was a significant rise in the death rate from both forms of ulcer in both sexes. At all times, in both sexes, gastric ulcer has been a commoner assigned cause of death than has duodenal ulcer.

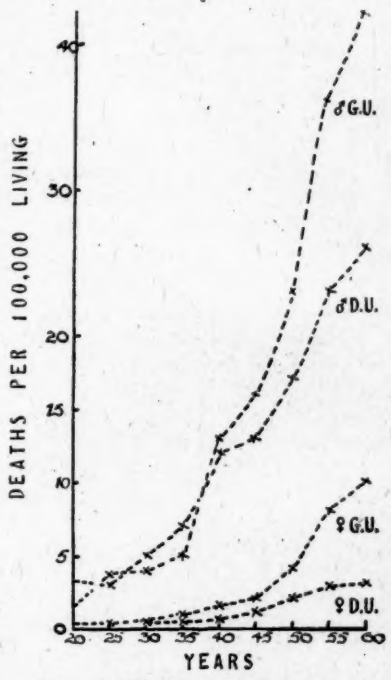


FIG. 2.—Civilian death rates per 100,000 living from gastric and duodenal ulcers in both sexes at various ages, for the year 1945. In male Service personnel at all ages in this year the corresponding rates were: D.U. 1.2, G.U. 1.5, per 100,000 living.

### Population Trends

It is pertinent to determine how far these fluctuations in crude mortality rates represent a response to alterations in the age distribution of the population. It is common experience that the mortality from perforation, haemorrhage, and operation increases with age. Analysis of the figures for the year 1945 shows that the death rate from all forms of ulcer increased steadily with age (Fig. 2). By plotting graphically the proportion of the population (*a*) over the age of 45, and (*b*) over 65, one can demonstrate that these older sections of the community are increasing steadily. Similarly, it may be shown that an increasing proportion of ulcer deaths occur in these two older groups, and in the following table the population distribution during the years 1911 and 1942 is compared.

| | 1911 | 1942 |
|---|---|---|
| Proportion of population over 45 .. .. .. | 21% | 35% |
| „ „ all peptic ulcer deaths over 45 .. | 37% | 90% |
| Proportion of population over 65 .. .. .. | 5% | 10% |
| „ „ all peptic ulcer deaths over 65 .. | 10% | 31% |

It is therefore apparent that the increase in the death rate in the older groups is out of proportion to their greater numbers and that the brunt of the overall increased death rate is being borne by these older people; but these figures alone give no indication of changing death rates in the other sections of the community.

Accordingly, death rates for gastric ulcer and for duodenal ulcer per 100,000 living were plotted in various age and sex groups for selected years from 1911 to 1945, inclusive. Limitations of space will not permit publication of all these graphs, but their trends will be briefly summarized.

*General.*—In both sexes and all age groups gastric ulcer has proved a more common assigned cause of death than has duodenal ulcer, despite the fact that in all carefully investigated modern series duodenal ulcer is much commoner than ulcer in the stomach. This may argue a higher mortality rate from gastric than from duodenal ulcer, but it may be only a reflection of the tendency of many practitioners to refer generically to a "gastric ulcer" whether the lesion be in the stomach or the duodenum. None the less, the view that gastric ulcer is more commonly fatal than duodenal ulcer is in accord with the military figures for 1940–2 and gastric ulcer deaths in the Services during the year 1945 again preponderated over duodenal ulcer deaths in the proportion of 5 to 4. These rates are lower than those in the corresponding civilian group owing to the medical selection before enlistment and the early invaliding of sufferers.

*Death Rates in Males Under 45.*—These curves show the fluctuations which inevitably occur when fairly small numbers are being considered. Although the death rate from both gastric and duodenal ulcer did not vary greatly between the years 1915 and 1939, it is perhaps significant that the therapeutic advances made during this period did not result in any appreciable lowering in mortality in this group. No weight can be attached to the rise during the war years, for these figures refer only to the civilian population, which then contained an abnormally high proportion of unfit men rejected for military service.

*Death Rates in Older Men.*—Some of these are charted in Fig. 3, which demonstrates the increasing incidence over the period reviewed, the increasing mortality with age, and the greater mortality from gastric ulcer than from duodenal ulcer.

*Death Rates in Women.*—The outstanding feature of these curves is the remarkable fall in gastric ulcer mortality in all except the very oldest (Fig. 4). The death rate from duodenal ulcer has always been small, and it has remained fairly constant in particular age groups, the overall increase in such mortality (Fig. 1) resulting very largely from the ageing nature of the population.

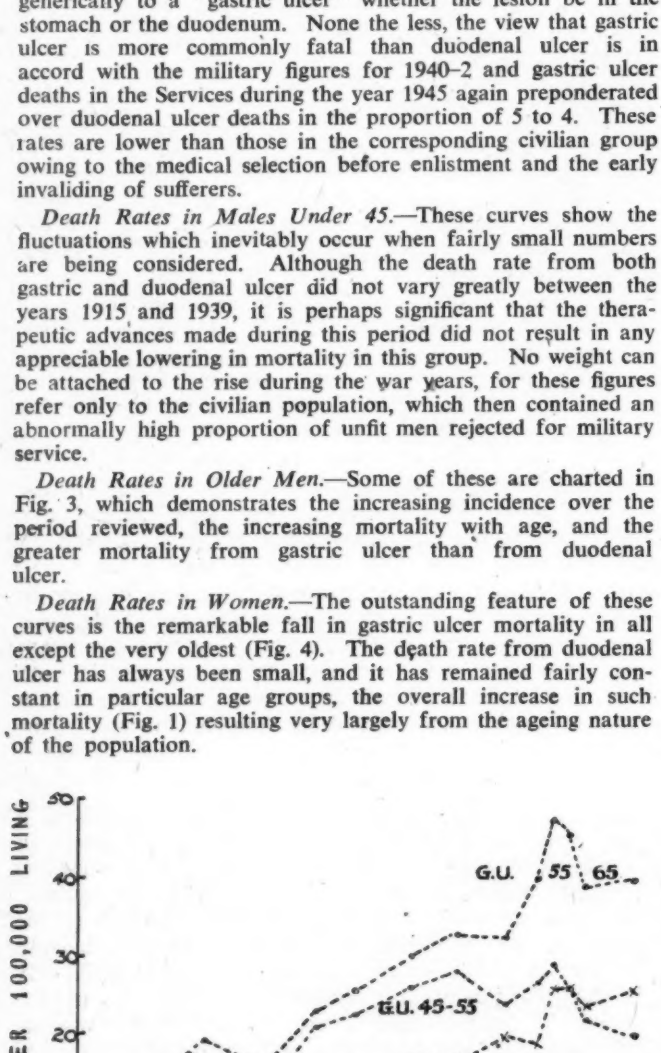


FIG. 3.—Male death rates per 100,000 living from gastric and duodenal ulcer in selected years from 1911 to 1945, in the age groups 45–55, 55–65; non-civilian males are excluded in the years of the two World Wars.

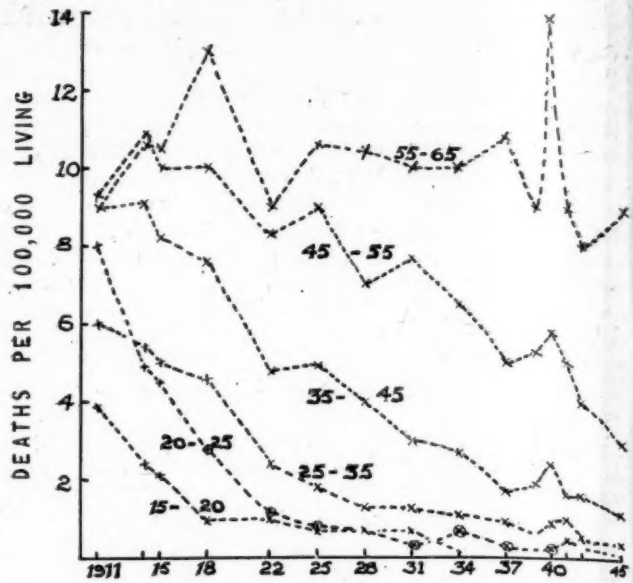


FIG. 4.—Female death rates per 100,000 living from gastric ulcer in various age groups for selected years from 1911 to 1945, non-civilian females being excluded in 1942 and 1945.

## The Changing Incidence of Perforation

Although in the year 1945 the mortality from both duodenal and gastric ulceration in both sexes increased with age, corresponding analysis of deaths for the year 1911 (Fig. 5) showed a high peak of mortality from gastric ulcer in young women. The lowering of the death rate in these young women is the result of the virtual disappearance of gastric perforation in this group. In 1907 Hawkins and Nitch, reviewing 556 cases of gastric ulcer treated at St. Thomas's Hospital, gave details of 92 cases of perforation, only 30 of which occurred in men. In this series perforation in men occurred most often over the age of 40; in women the great majority of cases occurred between the ages of 15 and 25. The curve obtained by plotting these cases in age groups is substantially the same as that derived from charting the details of Brinton's (1857) cases of 199 perforations, only 60 of which occurred in men. From the details accompanying this communication of Hawkins and Nitch it appears that at least half of the ulcers which perforated in young women were chronic in character, the perforations being preceded by a long history of dyspepsia and the ulcer bed being scarred. This age-and-sex incidence of peptic perforation is in striking contrast to the experience of Illingworth, Scott, and Jamieson (1946), who reviewed 880 cases of perforation occurring between 1938 and 1943, 95% of them in men, the perforation being in the duodenum in 87% of cases. In their series the commonest age at perforation was between 35 and 50.

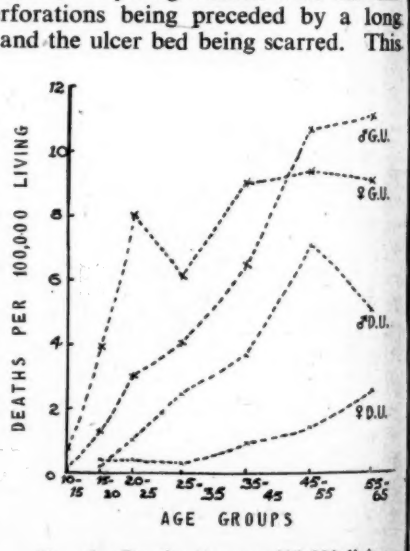


FIG. 5.—Death rates per 100,000 living from gastric ulcer and duodenal ulcer in various age groups for the year 1911.

These findings tally closely with figures collected by Boggon, by Forty (1946), and in a series at St. Mary's Hospital over the past ten years. That Illingworth's series consisted almost entirely of chronic ulcers is indicated by the fact that in the absence of medical treatment a great majority of cases relapsed within five years, some 20% of them suffering further major complications.

All earlier works consulted agree on the age-and-sex incidence of gastric perforation, but the only series of perforated duodenal ulcer found after prolonged search is the small one collected from the literature by Moynihan and published by him in 1905. The relative rarity in females is apparent, and it seems that on the whole these perforations occurred at an earlier age than those in the series of Illingworth *et al.* The difference, however, is not sufficient to be significant.

Apart from the evidences of the changing nature of gastric ulcer in women, the most striking features of these analyses are:

1. The striking proof of the ageing nature of our population.
2. The evidence of increased mortality in the older age groups.
3. The steady rise in total peptic ulcer deaths between the years 1921 and 1939, with a well-marked sudden increase in 1940 and 1941, this increase affecting the mortality from both gastric and duodenal ulcer in both sexes and all age groups. It has been pointed out by Illingworth that there was a marked increase in the incidence of perforation in the autumn of 1940 and the spring of 1941—that is, at the time when the real seriousness of the late war was first brought home by the defeat of the French armies and the bombing of this country. As Illingworth has further pointed out, this prevalence of perforation was not confined to areas subject to aerial bombardment. It is, however, legitimate to infer that the nervous strain and anxiety engendered by circumstances was nation-wide. The 1942 fall in death rate is the most pronounced during the period of observation. The explanation is perhaps that the circumstances which produced the rise in 1940 and 1941 advanced the death of some who might otherwise have survived till 1942 or 1943, and the population during these latter years therefore contained relatively fewer of the less hardy elements.
4. The maintenance or actual increase in death rate from duodenal ulceration in all age groups despite therapeutic advances, particularly in the treatment of perforation and haemorrhage—a circumstance which suggests that the actual incidence of the disease in the population at large has undergone a considerable increase.
5. Only in gastric ulceration in young women has there been any striking decrease in mortality. This has been the result not of corresponding increase in medical knowledge but of some unknown evolutionary process. It is perhaps significant that chlorosis, once a frequently associated disease, has now virtually disappeared.

## Conclusions

Certain difficulties inevitably arise in the course of any attempt to trace the history of a disease. Earlier accounts are based on very imperfect knowledge, the growth of understanding having paralleled the evolution of the disease. Yet certain writings stand out, and one feels that the observations contained therein are reliable even though it may be difficult to communicate this confidence to others. The inadequacies of death-rate statistics has already been stressed, but a review of these figures affords an idea of the trend which a disease is taking. Military surveys and series of cases of perforation published at different periods strongly suggest that the pattern and distribution of gastro-duodenal ulceration have materially changed. When all the evidence from these independent sources is entirely consistent certain conclusions may be drawn.

It would appear that gastric ulceration, at least in its present form and prevalence, is a disease of comparatively recent evolution, and there is good reason to believe that ulceration of the duodenum is a disease of even later development.

While, so far as can be ascertained, duodenal ulceration has simply increased in frequency during the period under survey, it is clear that in the case of gastric ulcer not only the age and sex distribution but even the actual nature and clinical pattern have altered considerably during the last hundred years or so, although it is probable that the total incidence has not undergone any very striking increase. In the time of William Brinton gastric ulcer principally affected women, and the ulcer seems to have been very similar to that which we encounter to-day, although a small proportion of chlorotic young women developed perforation of an acute ulcer. Haematemesis in young women was relatively uncommon, most women so affected being in their fifth decade. At the beginning of the present century chronic gastric ulcer was becoming relatively more frequent in males, but a larger number of women of child-bearing age suffered from haematemesis due to acute superficial ulceration. Gastric perforation was predominantly a disease of young women. It is difficult to determine exactly when this state of affairs altered, but it is probable that the change occurred during the period of the first world war.

In the course of the preceding investigation the changes in the incidence, distribution, and pattern of the various forms of peptic ulceration have been traced in some detail. It will be seen that these changes are complex, and that if we are to accept the proposition that peptic ulcer is one single clinical entity, the result of the operation of one set of aetiological factors, then it is difficult if not impossible to see how these changes could have taken place. On this historical evidence alone, even if on no other, a clear-cut distinction may be made between gastric ulcer and duodenal ulcer as separate diseases with different mortality trends. A similar distinction must be made between the chronic type of ulcer, whether sited in the stomach or the duodenum, and the acute variety. In the past the many features which these conditions possess in common have tended to obscure their essential differences and therefore led to some confusion of thought in the study of their causation. It cannot be gainsaid that all these diseases are probably related to one another, but that is not to say that they are different manifestations of the same disease process. It is suggested that such confusion and difficulty will inevitably arise in the study of these diseases unless they be considered individually until further knowledge permits of evaluation of the features they have in common. For the present it must be stressed that the history and evolution of gastric ulceration in its various forms are so very different from those of duodenal ulceration as to stamp the two conditions as separate entities.

While it cannot be denied that constitutional factors may play an important part in the pathogenesis of peptic ulceration in its various forms, it is difficult to believe that fluctuations in such factors alone could be responsible for the many changes which have occurred, and these must therefore be attributed to changing environmental influences. In view of the convincing evidence of gross increase in the prevalence of gastric and duodenal ulceration the view that they are concomitants of life under modern conditions is to a large extent substantiated.

## Summary

Alterations in the incidence, age-and-sex distribution, and clinical features of gastric and duodenal ulcer are surveyed over a period of years.

In particular the changes which have occurred during the present century are examined on the basis of clinical surveys, the Registrar-General's returns, and post-mortem statistics.

It seems probable that gastric ulceration was uncommon until the beginning of the nineteenth century, and there is little evidence to suggest that duodenal ulceration was other than a rare disease until about the beginning of the present century.

Since that time there is evidence of a considerable increase in the incidence of duodenal and gastric ulcer in males. Although gastric ulcer in females has become very much rarer, investigations point to an increase in the frequency of duodenal ulcer.

The increased mortality from gastric and duodenal ulcer in males and from duodenal ulcer in females affects principally those in the later age groups, and the ageing nature of the population therefore results in an increase in total mortality which is thus more apparent than real. But even in the younger age groups mortality has either risen or remained steady, except that the mortality from gastric ulcer in young females has shrunk to negligible proportions.

Peptic ulceration is a disease which causes considerable morbidity in relation to its mortality rate. The mortality from gastric ulcer apparently exceeds that from duodenal ulcer quite apart from any deaths which may result from neoplastic change in a gastric ulcer.

Although little change can be detected in the nature of duodenal ulceration it is clear that the pattern of gastric ulceration has altered profoundly during the last 100 years.

The various forms of peptic ulceration, gastric and duodenal, acute and chronic, can from the aetiological point of view be regarded as quite separate, although they are almost certainly related conditions.

The cause of these changes, and accordingly the causation of the diseases themselves, are to be sought in environmental circumstances rather than in constitutional factors.

There is considerable support for the view that the evolution of gastric and, more particularly, duodenal ulceration has paralleled the development of the highly developed civilized state of to-day.

I am indebted to Dr. J. F. Ackroyd, Dr. T. C. Hunt, and Professor G. W. Pickering for invaluable criticism and advice in the preparation of this paper.

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# SOME PROBLEMS OF CAUSALGIC PAIN

## A CLINICAL AND EXPERIMENTAL STUDY*

BY

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Ever since Weir Mitchell and his colleagues at the time of the American Civil War drew attention to the occasional occurrence of persistent pain and tenderness following nerve injuries and amputations (Mitchell, Morehouse, and Keen, 1864 ; Mitchell, 1872) these conditions have presented many intriguing problems. There have, however, during recent years been some advances in our knowledge of these distressing cases.

Lewis (1937) found that in some subjects cutaneous tenderness could be produced through nervous channels—for example, by stimulating a cutaneous nerve with a weak faradic current. As a result of his investigations he concluded that such hyperalgesia was due to nerve impulses leading to the liberation of a pain-producing chemical substance from cellular elements in the skin, and that the nerves concerned were not sympathetic nerves or ordinary sensory nerves, but special nerves belonging to the posterior root system. These nerves he named nocifensor nerves, and the hyperalgesia they produced nocifensor hyperalgesia. It seemed to Lewis, and has seemed to many others since, that this experimental hyperalgesia must in some way be related to hyperalgesia following nerve injuries, though apparently at variance were Lewis's finding that experimental nocifensor hyperalgesia could be produced after the degeneration of sympathetic nerves to the skin following sympathetic ganglionectomy and the relief of causalgic pain and hyperalgesia that is often achieved by sympathectomy.

Homans (1940), among others, has drawn attention to cases of nerve injuries in which hyperalgesia develops without spontaneous pain or at least without burning pain. He suggested that the difference between these cases and cases of classical causalgia with burning pain was only one of degree, and to describe them he used the term "minor

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causalgia." It might, however, be preferable for some such term as "traumatic neuralgia" to be used to describe the whole group of cases, whatever the degree of severity, and for the term "causalgia" to be confined to those severe cases of which burning pain is a feature, or to be used, as it was originally by Weir Mitchell (1872), to describe only the symptom of burning pain.

Riddoch (1941) remarked on the similarity between phantom pain following amputation and causalgic pain following peripheral nerve injuries. As after peripheral nerve injuries, so after amputations all gradations of pain occur. The hyperalgesia that develops in the stumps of many patients with post-amputation pain is, moreover, similar in character to hyperalgesia in cases of causalgia. And further, as pointed out by Leriche (1939), Livingston (1943), and White (1944), some cases of post-amputation pain may, like some cases of causalgic pain after nerve injuries, be relieved by sympathectomy. My personal experience has been that sympathectomy produces satisfactory relief of pain in both conditions in about 60% of cases. Pain after amputation therefore might well be called amputation causalgia.

Between October, 1944, and April, 1946, there came under my care at No. 7 Indian Base General Hospital 25 patients with amputations who had persistent pain and tenderness of some severity—in 18 of these phantom pain was the chief complaint—and 14 patients with causalgic pain following peripheral nerve injuries. A number of clinical experiments were carried out with the object of throwing further light on some of the problems connected with these cases.

### 1. Mechanism of Production of Cutaneous Hyperalgesia

In order to determine whether there was any relation between the experimental hyperalgesia described by Lewis and the hyperalgesia that develops in some cases of amputation and peripheral nerve injury, attempts were made in a number of patients to produce experimental hyperalgesia by stimulating a cutaneous nerve, most often the lateral cutaneous nerve of the forearm or the internal saphenous nerve below the knee. In 11 patients with moderate or severe pain following amputation or peripheral nerve injury hyperalgesia was readily produced in this way, whereas in eight patients with amputations or nerve injuries who did not have pain or tenderness and in four who had mild causalgic states with only slight pain or tenderness similar attempts to produce hyperalgesia failed. This finding strongly supports the view that hyperalgesia in these conditions is produced through the same nervous channels as hyperalgesia obtained by faradic stimulation.

### 2. Reasons for the Relief of Pain and Tenderness by Sympathectomy

Among the many views that have been advanced in an effort to explain how sympathectomy relieves causalgic pain and tenderness one which has occasionally been put forward, but which has usually been dismissed immediately by those who have considered it, is that sympathectomy relieves pain in some of these cases by interrupting a pain pathway from the site of nerve injury and from hyperalgesic skin.

The possibility that this view was correct first occurred to me on observing the rapidity of the relief obtained by blocking the sympathetic chain with procaine in many of these cases. I noticed that when a sympathetic procaine block relieved pain and tenderness it almost invariably did so immediately, taking no longer than the few seconds required for the procaine to produce a nerve block, and often occurring before there was any noticeable vascular change in the limb. Lewis (1937) found that hyperalgesia produced by faradic stimulation of a cutaneous nerve persisted for many hours after nerve stimulation had ceased, but that if the nerve was first blocked with procaine and then stimulated proximal to the block hyperalgesia did not develop later when the effect of the procaine had worn off. He thus demonstrated that the nerve impulses producing hyperalgesia were transmitted only during the period of nerve stimulation and not subsequently, and that the persistence of hyperalgesia for many hours was due to the persistence of a relatively stable state in the skin, which for its maintenance "does not require a continuous flow of nerve impulses from the original source of disturbance" (Lewis, 1942). Therefore, if the effect of sympathetic denervation was merely to cause a cessation of nerve impulses to the skin, hyperalgesia would be expected to persist for several hours. The most likely explanation for the extremely rapid relief of tenderness would seem to be that when interruption of the sympathetic chain relieves pain and tenderness it does so by interrupting the sensory pathway.

In support of this view, I have elsewhere (Bingham, 1947) recorded an observation I made when excising the superior cervical sympathetic ganglion under local analgesia in a case of causalgia involving the trigeminal nerve. A number of experimental observations have been made which provide further evidence in its support.

In nine patients with causalgic pain and tenderness following peripheral nerve injury or amputation an area of experimental hyperalgesia was produced in a part of the affected limb not previously tender and a sympathetic procaine block was then carried out. For the upper limb the procaine injection was most often made beneath the second rib, and for the lower limb at the level of the second lumbar vertebra. At these levels it is unlikely that the procaine could affect the roots of the brachial plexus or of the sciatic nerve. Certainly in no case was there any evidence that these nerve roots had been affected; and in cases in which an operative sympathectomy was subsequently performed the effect of the operation on the patients' pain and tenderness was similar to that achieved by the procaine injection. In three of these nine patients sympathetic block—seen to be effective by the development of hyperaemia and increased warmth in the limb and by the cessation of sweating—did not relieve the pain and tenderness from which they had been suffering; and in these patients the experimental hyperalgesia was also not relieved. In the remaining six patients sympathetic block relieved the pain and tenderness from which they had been suffering, and also relieved simultaneously, usually within a minute of the injection, the cutaneous hyperalgesia produced experimentally. For the reason given above this rapid relief suggests that the sensory pathway had been interrupted.

A much more conclusive observation, however, was made in these six cases. After a few hours, when the effect of the procaine had worn off and the patients' original pain and tenderness had returned, the experimentally produced hyperalgesia was also found to have returned. The return of the original pain and tenderness is of no particular significance, for the conditions responsible for the original nerve irritation and therefore for the transmission to skin of the nerve impulses producing the original hyperalgesia were still present. But the return of the hyperalgesia produced by faradic stimulation cannot be explained in this way. From Lewis's demonstration that such hyperalgesia is brought about by nerve impulses transmitted to skin only during the period of nerve stimulation it follows that its return after the effect of the sympathetic block had worn off cannot have been due to further impulses then reaching the skin. The hyperalgesic state produced at the time

the nerve was stimulated must have remained unchanged, and the temporary relief of tenderness can have been due only to temporary interruption of the sensory pathway. Thus the view that in some cases, but not in all, sympathetic block or sympathetic ganglionectomy interrupts the sensory pathway from hyperalgesic skin is seen to receive definite experimental confirmation.

As already noted, Lewis found that hyperalgesia could be produced in some subjects after sympathectomy, and he naturally concluded that neither the efferent nor the afferent pathway was by way of the sympathetic chain. This finding of Lewis's has, however, been brought into accord with those described above by demonstrating that while hyperalgesia may be produced after sympathectomy in some individuals, as was found by Lewis, this cannot be done in all those individuals in whom experimental hyperalgesia may be produced before sympathectomy. I have found in two patients whose causalgic pain and tenderness had been relieved by sympathectomy that it was no longer possible, as it had been before operation, to produce an area of hyperalgesia on the affected limb.* On the other hand, in one case of post-amputation pain and tenderness in which sympathectomy had been performed without relieving the condition it was still possible after operation to produce readily an area of hyperalgesia on the stump.

Whilst these experiments indicate that sympathectomy in some cases interrupts the pathway for causalgic pain it does not necessarily follow that there are not occasional cases in which sympathectomy is of benefit for other reasons. I have had one case of causalgia—a case following a vascular injury—in which sympathetic block relieved pain and tenderness, not immediately, but after several hours. In this particular case sympathetic block clearly did not interrupt the pain pathway, and benefit was probably due to relief of vasospasm and improvement in blood supply to ischaemic nerves.

### 3. Reason for Failure of Sympathectomy in some Cases

The experience of most observers has been that in some cases of undoubted causalgia sympathectomy fails. My personal experience has been that in about 40% of cases interrupting the sympathetic chain, though it causes such associated symptoms as cyanosis and increased sweating to clear up, produces little or no relief of pain or tenderness. There would appear to be two possible reasons for the failure of sympathectomy in these cases.

1. Pain may arise centrally, in the spinal cord or in higher centres. But this would fail to explain the persistence of skin tenderness, and it is almost always found that when sympathectomy or sympathetic block fails to relieve spontaneous pain it fails also to relieve cutaneous tenderness.

2. Pain may still arise in the periphery, but may follow some other pathway. To investigate this possibility attempts were made in 10 patients with causalgic pain and tenderness, on whom sympathectomy or sympathetic blocks had proved ineffective and on whom no operations, except in some cases operations on peripheral nerves or amputation stumps, had been performed, to relieve their pain and tenderness by procaine block of individual peripheral nerve trunks, by brachial plexus block, or by low spinal analgesia. In all cases pain was relieved, and therefore, as suggested, in these cases pain must have arisen in the periphery, but must have followed some pathway other than the sympathetic chain. The only alternative pathway that seems at all likely is by the posterior roots of the nerves that had been injured.

*At the time these patients were tested after operation an area of hyperalgesia was easily produced at a corresponding point on the opposite limb, thus showing that, except for the part affected by the sympathectomy, the proneness of the patients to develop hyperalgesia had remained unaltered.

### 4. Reason for the Frequent Failure of Posterior Root Section and Chordotomy

There is no difficulty in explaining why posterior root section should fail to relieve pain and tenderness when the pain pathway is by the sympathetic chain. But apparently, even in those cases in which interruption of the sympathetic chain is without effect, posterior root section, though it may relieve tenderness, does not often succeed in relieving pain. And while section of the contralateral spino-thalamic tract is sometimes successful (Taylor, 1938; White, 1944), this operation also may fail (Ministry of Pensions, 1939; Bailey and Moersch, 1941). The difficulty of reconciling the failure of these operations with the view that in these cases pain from the periphery was reaching the cord by way of the posterior roots of the injured nerve would, however, seem to be overcome by observations I made on two cases.

The first of these cases was that of a patient with phantom pain and tenderness following an upper-limb amputation who was treated by contralateral-tract section at the level of the second cervical segment after an operation on the stump and sympathectomy had proved unsuccessful. There was complete freedom from pain and tenderness for several days. Pain then gradually returned, and in a few weeks was very much as it had been before the operation. Tenderness, however, remained very considerably relieved.

In the other case, that of a patient with severe phantom pain and tenderness following a lower-limb amputation, chordotomy at the level of the sixth thoracic segment was performed after lumbar sympathetic blocks had been found to give no relief. Pain and tenderness were completely relieved for a day or two. Some pain then returned, though this remained less severe than before. Tenderness was completely relieved.

The satisfactory relief of stump tenderness by chordotomy in both these cases would seem to indicate that the failure to relieve pain was not the result of failure to interrupt the sensory pathway from the periphery. Moreover, careful examination of sensation in both cases some time after operation showed that the return of pain could scarcely have been due to the levels of cord section not being high enough; for it was found in both that pain sense began to diminish one dermatome below the level of section and appeared to be completely absent a few dermatomes below that level. Therefore tract section at C2 level in the first case should have been at a level high enough to produce marked relief of pain in the phantom hand, and certainly in the second case section at T6 level should have been sufficiently high.

It is necessary, therefore, to look for some other explanation. Some months after operation attempts were made to relieve pain in the first case by means of brachial plexus blocks on three occasions and in the second case by means of spinal analgesia to T11 segment. In neither case was any relief of pain produced.

Two possible reasons for these findings require to be considered. (1) In these two cases spontaneous pain might have arisen centrally before the performance of any operations. This must be regarded as extremely unlikely, for it would have been an extraordinary coincidence for chordotomy to have been carried out on the only two such patients I encountered. (2) Following these operations a new focus of pain production might have developed in the cord or in higher centres. The relief of pain that occurred in these cases for a few days after chordotomy lends support to this view, for it seems likely that this temporary relief was due to interruption of the pain pathway from the periphery and the return of pain to the development of a new central focus. If the effect of spinal analgesia or brachial plexus block had been observed in these cases before the perform-

ance of chordotomy more conclusive evidence might have been obtained, but this unfortunately had not been done.

However, in the case of the patient with the upper-limb amputation who was treated by chordotomy in the upper cervical region the possibility that the cord section had given rise to a new focus of pain production receives support from a further observation. From a few weeks after the operation this patient complained of painful sensations in the leg on the side of the amputation as well as in the phantom arm, even though the leg was completely analgesic. Sometimes there was only an itching or pricking sensation in the leg, but at other times there was burning pain and a pulling pain deep in the foot. The patient mentioned these pains without being questioned, and there would seem to be no doubt about their having been genuine. Pain in both the arm and the leg is what would be expected if pain resulted from section of the spino-thalamic tract in the upper cervical region; and no reason can be thought of for pain in the leg to have arisen as a functional condition. Riddoch (1941), moreover, has drawn attention to the painful phantom-limb sensations that occasionally develop in paraplegic patients who have suffered complete division of the spinal cord. These painful sensations would appear to be exactly similar in origin to the pain experienced by this patient after chordotomy.

It is possible to see how posterior root section also might lead to a central focus of pain production; for pain fibres in posterior roots, cut off by the root section from their cells of origin in posterior root ganglia, would undergo degeneration, and this might well cause changes around posterior horn cells that would in some individuals give rise to pain.

Thus when either chordotomy or posterior root section fails to relieve causalgic pain it is not necessary to conclude that pain was functional or that it had, before the performance of these operations, arisen centrally.

### 5. Conclusions concerning the Pain Pathway and the Nature of the Nerve Fibres

It is unlikely that the nerve fibres that convey pain from the site of nerve injury and from hyperalgesic skin sometimes reach the cord entirely by way of the posterior roots of the affected peripheral nerve and in other cases entirely by way of the sympathetic chain, thus passing to cord segments in the thoracic region. The most acceptable explanation of the findings that have been described is probably that in all cases these nerve fibres follow to some extent both pathways, the actual proportion following each pathway varying in different individuals. This double pathway (shown diagrammatically in the accompanying illustration) may exist even when complete relief follows blocking of one pathway alone; for any considerable reduction in the number of pain impulses may reduce the number reaching consciousness below that necessary to give rise to a sensation of pain.

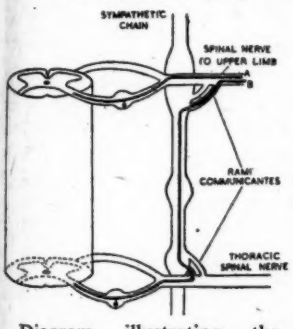


Diagram illustrating the double pathway followed by the nerve fibres that convey causalgic pain between an injured peripheral nerve and the spinal cord. A = Nerve fibre that conveys causalgic pain by way of the posterior root of the injured nerve. B = Nerve fibre that conveys causalgic pain by way of the sympathetic chain and by the posterior root of a thoracic spinal nerve.

These nerves cannot be regarded as belonging to the physiological sympathetic system, if only for the reason that they do not always follow this pathway. Presumably, like other sensory nerves, including visceral afferents running in the sympathetic chain, they have their cell station in posterior root ganglia. However, most recent investigations have failed to show any alteration in sensory acuity after sympathectomy (Lewis, 1942; White and Smithwick, 1942); and in a few patients whose sensation I examined after their causalgic pain had been relieved by sympathectomy it was not possible to detect any diminution as compared with the opposite normal limb in either the intensity or the duration of pain sensation. Threadgill (1947) has, it is true, obtained evidence from animal experiments which indicates that painful stimuli may be appreciated by impulses transmitted centrally over the sympathetic chain. Nevertheless, if the nerves that form the sensory pathway for causalgic pain and tenderness play any part in normal sensory appreciation it can be only a very subsidiary and unimportant part; and it would seem desirable to distinguish them from other nerves belonging to the posterior root system. This may be done by using the term nocifensor nerves, already suggested by Lewis for the nerves concerned with the production of hyperalgesia.

We have seen that pain may result from cord section when this is carried out in patients with causalgic pain. Chordotomy for other conditions apparently yields better results; and it would therefore appear that it is those individuals who develop pain after injury to peripheral nerves who are liable to develop pain following injury to the spino-thalamic tract. Thus the nocifensor nerves responsible for the development of causalgic pain appear to be associated with neurones in the cord that also cause persistent pain when injured; and it seems a reasonable assumption that these neurones are special central connexions of the peripheral nocifensor nerves.

### 6. Reason for Causalgic States Developing in Certain Patients

It is necessary to explain why, of two patients with an apparently equally mild or equally severe nerve lesion, one may have causalgia and the other not; and why, of two patients with an apparently equally perfect or equally imperfect amputation stump, one may have a painful phantom and a painful hyperalgesic stump and the other not. It is also necessary to explain how pain may persist after division of nerves well above the site of the original injury. The conclusion would seem to be inevitable that these conditions are not due to any peculiarity in the nature of the lesion but to an abnormality in the nerves of individual patients that may be said to render them "causalgia-prone." That individual variation in nocifensor nerves is related to the development of causalgic pain is shown by hyperalgesia from faradic stimulation being readily produced only in those patients with amputations or nerve injuries who have a marked degree of pain.

This does not mean that such factors as the type of trauma or the development of infection are never of any importance. But there would not seem to be any doubt that a more important factor than the nature of the lesion is an abnormality in the nerves of the patient concerned, and that this takes the form of an unusually well developed nocifensor system.

### Summary and Conclusions

From clinical observations and from the findings in a number of clinical experiments the following conclusions have been arrived at concerning the development of causalgic pain and tenderness.

1. The nerve fibres concerned in the production of hyperalgesia in causalgic states and the nerve fibres conveying pain

from the site of nerve injury and from hyperalgesic skin are special nerves—the nocifensor nerves first described by Lewis.

2. These nerves travel in varying degree by two alternative pathways between an injured peripheral nerve and the spinal cord. One pathway is by way of the sympathetic chain to thoracic cord segments; the other by way of the posterior roots of the injured nerve.

3. The site of origin of causalgic pain following peripheral nerve injury or amputation is, before the performance of such operations as chordotomy or posterior root section, in the periphery.

4. The reason for pain persisting or returning after chordotomy, or after section of the posterior roots of an injured nerve, when these form the principal pain pathway, is the development of a central focus of pain production.

5. The chief factor in determining whether or not pain develops after injuries to peripheral nerves or after amputations is individual variation in nocifensor nerves rather than the nature of the nerve lesion.

My thanks are due to Mr. Grant Massie, late Brigadier, A.M.C., and Consulting Surgeon, India Command, for providing me with the opportunity of carrying out this work, and for his interest and encouragement. I am also indebted to my former colleagues, Lieutenant-Colonel H. R. Pasricha, I.M.S., and Major T. Denness, I.M.S., for allowing me to examine and investigate patients under their care.

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# A FATAL CASE OF MYELITIS AFTER ANTIRABIC VACCINE

BY

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This case is recorded because of the rarity of the accident occurring with antirabic vaccine, and because of the renewed interest in its pathogenesis following work by Kabat *et al.* (1947) in the artificial production of similar lesions in monkeys.

## Case Record

The patient, a white soldier aged 26 serving in India, was in perfect health and physical development a few days before his admission to hospital on July 9, 1946, when he first complained of fever and pains in his limbs. He had been bitten by a healthy puppy 14 days previously, and had received 12 antirabic injections, starting two days after the incident. The dog was said to be still healthy and the course was thereupon stopped.

On examination his temperature was 101° F. (38.3° C.), pulse 88, and respirations 18. He was inclined to be drowsy, his tongue was furred, and there were several red areas on the front of his abdomen at the sites where the injections had been given. With the exception of a few rhonchi audible in the chest and slight enlargement of the axillary and inguinal lymph glands, nothing abnormal was observed. Routine blood slides examined four-hourly were negative for malaria parasites. He was treated symptomatically with a mixture containing acetylsalicylic acid, 3½ gr. (0.23 g.), phenacetin, 2½ gr. (0.16 g.), and caffeine, ½ gr. (32 mg.), six-hourly.

On 10 July he appeared to be more toxic. His eyes were congested and his face flushed; his temperature was 104.6° F. (40.3° C.). There were still no physical signs beyond those of mild bronchitis and slight glandular enlargement. Repeated blood slides were still negative for malaria parasites, and a white cell count was 12,800 per c.mm. (polymorphs 79%, lymphocytes 18%, monocytes 2%, and eosinophils 1%). Routine blood cultures and agglutinations were taken, the results being later reported as: typhoid and paratyphoid A–O, 1/40; *Proteus OX* 2 and *OX* 19, 1/25; *Proteus OX* K, 1/50; blood culture sterile. In view of the local endemicity of malaria, a course of quinine sulphate, 10 gr. (0.65 g.) thrice daily, was started. Later that evening it was noticed that he had not passed urine, and it was necessary to catheterize him. At this time he began to experience bouts of hiccuping and vomiting.

On July 11 the bronchitic signs had increased. Urinary retention persisted and failed to respond to 1 ml. of acetylcholine intramuscularly, so that catheterization was necessary. Next day he started to complain of inability to move his legs. The hiccup had become more distressing, but he was still quite clear mentally, and his temperature had fallen to 99° F. (37.2° C.). Clinical examination at this stage revealed no abnormality of the cranial nerves, there being no laryngeal spasm or dysphagia. The upper limbs were normal, but there was a flaccid paralysis of the lower limbs, with absent knee-jerks, depressed ankle-jerks, and flexor plantar responses. There were no sensory changes. The differential diagnoses now considered included paralytic rabies, the neuroparalytic effects of antirabic vaccine, and poliomyelitis. The first diagnosis was unlikely, as the dog was still healthy, leaving the effects of the vaccine and poliomyelitis as possibilities. When seen later that morning the patient was cyanosed, dyspnoeic, and troubled by ceaseless hiccup. The paralysis was now ascending, involving his lower abdominal musculature and threatening to involve his respiratory muscles. In view of this possibility he was transferred to our hospital at Barrackpore, where there was an iron lung. During the journey by ambulance his respiration became distressed, so that he required oxygen and artificial respiration from time to time.

When seen on arrival he was still conscious, but was very distressed. A rapid examination showed the cranial nerves to be normal, there being neither laryngeal spasm nor dysphagia and no neck rigidity. The upper limbs appeared to be normal. The lower intercostal and abdominal muscles were paralysed and the superficial reflexes were absent, but the diaphragm was still functioning. There was a flaccid paralysis of the lower limbs with absent knee- and ankle-jerks, the plantar responses being indeterminate. No gross sensory disturbances could be demonstrated. Examination of the chest revealed diffuse rhonchi with moist sounds audible chiefly at the bases. There were angry red indurated areas on the abdomen at the sites of the previous inoculations. Neither the liver nor the spleen was enlarged, but the bladder was distended. It was decided to catheterize him and leave him with an indwelling catheter. A course of penicillin was begun (50,000 units four-hourly, intramuscularly) to combat the secondary respiratory infection. The patient was then put into an electrically driven iron lung of the Nuffield pattern. Intermittent oxygen was administered as he appeared to be having difficulty in accommodating himself to the iron lung. At times he lapsed into delirium, shouting out orders to imaginary persons as though involved in a fight. He was then given phenobarbitone, 1 gr. (65 mg.), and a bismuth mixture, which quieted him and relieved his hiccup. Later in the evening the paralysis spread to his shoulder and upper-limb musculature, but he could still move his fingers. During the night his condition continued to deteriorate, and by morning the paralysis had involved the muscles of deglutition, necessitating nasal feeding. Later in the morning (July 13) he became unconscious, his general condition became much weaker, and he died five hours later without recovering consciousness. A lumbar puncture performed within an hour after death yielded a clear cerebrospinal fluid with a protein of 100 mg. per 100 ml. and 110 cells per c.mm. (lymphocytes 64%, large mononuclears 36%).

*Necropsy Report* (Capt. I. P. V. Leggett, I.A.M.C.).—The brain appeared congested on its outer surface, but on section there was no gross macroscopic abnormality. The coverings of the cord were congested, the pial blood vessels being very prominent. On section the cord was oedematous, with mushrooming of its edges, but there were no visible haemorrhages in its substance. With the exception of slight prominence of the mesenteric lymph glands and terminal hypostatic pneumonia, no other abnormality was found. The brain and cord were removed and fixed in formalin before dispatch to Major L. Krainer, at the C.M.P.L., Poona. His report was as follows: "Spinal-cord sections stained by H. and E. show numerous perivascular foci of demyelinization situated in the white matter without any systematic arrangement; all the foci are new and show cellular proliferation in addition to destruction of axis cylinders and myelin sheaths. There is extensive perivascular round-cell infiltration in the substance of the cord, and there are a few round cells in the meninges. Sections of the brain-stem show the same process with lesser intensity extending up to the pons. No pathological changes were detected in the cortex cerebri and cerebelli. Diagnosis: acute disseminated myelitis extending into the brain-stem."

## Discussion

This case illustrates several interesting features. On the history a diagnosis of rabies is unlikely. The probable diagnosis is a polyneuritis or myelitis due to the antirabic vaccine, the former being less likely in view of the absence of sensory changes. This paralytic accident being very rare, an alternative cause for the ascending myelitis could be acute anterior poliomyelitis, particularly as the latter is endemic in this part of India and is usually very virulent in British troops. Clinically these two conditions are indistinguishable.

The incidence of neuroparalytic accidents following antirabic vaccine has been given by Greenwood (1945-6) as being 1 in 8,517 cases (0.012%) treated with killed phenol vaccine, and 1 in 5,814 cases (0.017%) for all types of antirabic vaccine, including killed phenol type, the mortality in the two groups being 25%. The onset usually occurs 13 to 15 days (maximum period 35 days) after the first injection of the vaccine, and may take one of four forms (Van Rooyen and Rhodes, 1940). (1) An acute ascending paralysis of the Landry type. The mortality from this is in the region of 30%, the remainder recovering completely. (2) A dorso-lumbar transverse myelitis, which is usually localized, affecting the lower limbs, bladder, and rectum. This complication is more common than the Landry type and has a mortality of less than 5%. A non-fatal case of this type was described by Imrie (1944). (3) A mononeuritis or multiple neuritis involving the cranial or peripheral nerves, and rarely the optic nerve, causing papilloedema as in the case described by Koenigsfeld (1945). (4) A meningo-encephalomyelitis syndrome described by Gordon and cited by Remlinger (1937). A case conforming to this type was described by Bussell (1946).

The various theories advanced to explain these accidents include causation by a virus, toxins, or allergy.

*The Virus Theory.*—These accidents were attributed to the the "street" virus modified by antirabic vaccine until cases occurred in persons not bitten by rabid animals, when the *virus fixé* was suspected of pathogenicity. Bassoe and Grinker (1930) were impressed by the similarity of their cases of encephalomyelitis after antirabic vaccine to those due to vaccinia and infectious fevers, and considered that an attenuated virus was transmitted by the vaccine. This view was held by Remlinger (1937) when vaccines containing the live virus were used. The neuritic group of accidents resemble the neurological complications following serum and other types of vaccine therapy described by Hughes (1944), in the aetiology of which a virus is suspected.

*The Toxin Theory.*—There is no convincing evidence that the vaccine contains rabies toxin, nor has the existence of this endotoxin ever been proved. Stuart and Krikorian (1928) produced paralytic lesions in rabbits by repeated inoculations of normal heterologous nerve tissue. They believed that the basic nerve substance of all antirabic vaccines contained a cytotoxin modified by physical and chemical agencies which could produce neuroparalytic accidents in susceptible persons.

*The Allergic Theory.*—Inoculating normal heterologous nerve substance into monkeys, Ferraro and Jervis (1940) produced disseminated neurological lesions with a pathological picture of perivascular infiltration and demyelinization. They postulated that the lipoid of the white matter functioned as a haptene, being actuated by the presence of protein. Similar effects, accelerated by the addition of adjuvants to brain-tissue inoculations, were produced by Kabat *et al.* (1947), who believed the antigen to be bound up with the myelin portion of the tissue. In a series of 16 patients developing neuroparalytic accidents, Horack (1939) reported a family or personal history of allergy in 87.5%, compared with 33.3% in controls. He suggested that those with a history of allergy should be tested for sensitivity to the vaccine. It was also suggested that the appearance of severe local reactions during treatment might indicate the simultaneous development of sensitivity in the central nervous system of some patients. For each of these types of sensitivity Horack described a method of desensitization.

In the above case killed carbolized vaccine was given, and skin sensitivity in the form of prominent reactions at the sites of inoculation was manifested. According to his friends the patient had never been ill before, but unfortunately the family history with regard to allergy could not be ascertained. The pathological findings of well-marked perivascular infiltration and demyelinization in this case are similar to those seen in Kabat's experimental lesions, although the latter were chiefly distributed in the brain. These findings differ from those of Stuart and Krikorian, in which mesodermal reactions were absent, but are similar to those of Bassoe and Grinker and to those of Bussell, with the exception of the intense meningeal reaction and haemorrhages in the latter's case. The balance of evidence would seem to be in favour of acquired anaphylaxis as the causation in the above case. It is probable, however, as suggested by Remlinger, that there is no single cause which will account for all types of neuroparalytic accidents.

## Conclusions

Antirabic treatment should be given only when the correct indications are present. A healthy dog should be kept under observation for the usual ten days before treatment is begun, except, possibly, in cases of severe bites on the face.

A family or personal history of allergy indicates the need for preliminary skin tests for sensitivity, and if excessive local reactions occur during treatment the desirability of desensitization should be considered. If the neuroparalytic complications have already made their appearance, then in view of the serious prognosis, especially in the Landry type, it would be worth while to try out the effect of antihistamine drugs on the basis of the allergic theory. At the same time the effect of these drugs on the skin reactions should be observed.

It is essential that an iron lung should be available in case of respiratory failure, preferably in an air-conditioned room if in the Tropics. For the purpose of minimizing respiratory complications a good suction apparatus is a great asset in clearing the secretions that accumulate in the pharynx of these patients.

The usual precautions during antirabic treatment—avoidance of unnecessary exertion and of alcohol, and provision of adequate rest—should be strictly enforced.

Post-mortem examination, with removal of the cord and brain, should be carried out in all obscure cases of myelitis as soon as possible after death so that further information may be obtained and an exact diagnosis made. A portion of

the brain and cord should be preserved in glycerol-saline or, better still, by refrigeration for virus studies.

Methods by which the amount of myelin tissue in these vaccines could be reduced to a minimum should be sought and perfected.

**Summary**

A fatal case of acute disseminated myelitis following antirabic treatment is described, together with the post-mortem findings.

The differential diagnosis and the aetiology are discussed.

Suggestions are made to reduce the incidence of these accidents in the future.

I wish to thank the D.G.M.S., War Office, for permission to publish this article, Captain R. D. Eagland, R.A.M.C., for his assistance in treating this case, and Dr. A. R. D. Adams, of the Liverpool School of Tropical Medicine, for valuable criticism.

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# Medical Memoranda

## Convulsions under Trilene Anaesthesia

Convulsions under trilene anaesthesia have been reported by Culbert (1942) and by Garland (1942), but in view of the rarity of the condition and because of the increasing use of this drug publication of the following case report is warranted.

### CASE REPORT

A soldier aged 20 was transferred from the V.D. wing to the minor surgical ward with chronic balanitis and was brought to the operating theatre on Aug. 11, 1947, for circumcision. His general condition was good, and 75 minutes before the operation he was given 1/3 gr. (22 mg.) of "omnopon" and 1/150 gr. (0.43 mg.) of scopolamine. Anaesthesia was induced, using the standard Army Boyle machine, with nitrous oxide and oxygen. Trilene was added to the mixture and the patient maintained in stage 3, plane II anaesthesia.

Midway through the operation convulsive movements of the arms began, the legs became similarly involved, and this developed into generalized convulsions. The operation was stopped, no further inhalation anaesthetic was given, and oxygen was administered. With some difficulty an intravenous injection of thiopentone was made, and the convulsions were controlled after the patient had received 0.2 g. Apnoea resulted, but no treatment was required for this, since respiration restarted almost at once.

As the patient's general condition was fair, the blood pressure being 110/70 and the pulse rate within normal limits, the operation was completed under nitrous-oxide–oxygen anaesthesia. The patient's pre-operative temperature was normal, and during the operation the theatre temperature was 24° C. Atropine was not given. The Trendelenburg position was not used. Except for some slight anoxia during the induction stage, oxygenation appeared adequate throughout. Respiration showed no evidence of carbon-dioxide imbalance.

Post-operative recovery was normal, and investigations showed: blood urea, 20 mg. per 100 ml.; blood sugar, 90 mg. per 100 ml.; serum calcium, 11.5 mg. per 100 ml.; Kahn test negative. Facilities for an electro-encephalogram were not available.

### COMMENT

This was not a case of tremor or spasm but of quite definite convulsions. These started in the limbs and not in the muscles of the eye and face as with deep ether convulsions.

Circumcision in the young adult requires moderately deep anaesthesia, and that produced in this case was adequate, although trilene was not pushed to the extent of producing tachypnoea.

The only factors mentioned by Minnitt and Gillies (1944) in the production of deep ether convulsions present in this case were a young adult patient and a septic condition—i.e., balanitis—but this was not in the least severe.

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## A Case of Strangulated Epigastric Hernia

Strangulated epigastric hernia is an unusual emergency. The literature from 1927 to 1946 contains only three cases of this condition (Chevereaux, 1929; Delannoy, 1933; Ballati, 1934) and two cases of incarcerated epigastric hernia (Zhman, 1934; Popper, 1936). The case reported below is of interest because of its rarity and the added difficulty in diagnosis owing to associated bilateral irreducible inguinal herniae.

### CASE REPORT

A man aged 65 was admitted to hospital with a history of severe vomiting for one day. He was of very low general intelligence. Associated with this vomiting there was marked epigastric pain with severe prostration. "Swellings" had been present in both groins and in the epigastrium for as long as he could remember. While in the admission room he vomited about 1 pint (570 ml.) of dark-brown fluid.

Examination revealed considerable dehydration and a furred and dry tongue. The temperature was subnormal and the pulse just perceptible. Bilateral irreducible inguinal herniae were present. Neither of these herniae was tender, and they had not lost an impulse on coughing. In the epigastrium, midway between the umbilicus and xiphisternum, was a tense and tender swelling about the size of an orange. The rapid onset of a high intestinal obstruction with severe pain and collapse associated with these physical signs pointed to the epigastric swelling as the cause of the present crisis.

The stomach contents were aspirated and a Ryle's tube left in position. Two pints (1.14 litres) of glucose-saline were given intravenously. The general condition improved enough for operation to be performed. Procaine infiltration analgesia was used. A transverse incision was employed and the hernial sac exposed. This proved to contain a quantity of foul blood-stained fluid and a gangrenous loop of bowel in "W" formation. A rapid resection of some 12 in. (30 cm.) of bowel was performed and an end-to-end anastomosis carried out. Repair was effected with overlap using catgut sutures. A small corrugated drain was left in the subcutaneous tissues.

Gastric aspiration was continued for two days with intravenous drip. At the end of this period the general condition was good and feeding was started. The patient had an uneventful convalescence.

### COMMENT

Epigastric hernia is probably a congenital abnormality. Difficulty in diagnosis occurs in that severe epigastric pain with tenderness and muscular rigidity may well be mistaken for an upper abdominal inflammatory lesion or for a perforated peptic ulcer. Pancreatitis may also be suspected, particularly when the hernia is small (Maingot, 1940). Richter's hernia may occur, causing a further confusion in diagnosis. A case has been reported in which the round ligament of the liver was involved in the hernial sac (Ballati, 1934). As might be expected, incarceration of the stomach has also been reported (Zhman, 1934).

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# Reviews

## CALCIFIED AORTIC VALVES

*Calcific Disease of the Aortic Valve.* By Howard T. Karsner, M.D., and Simon Koletsky, M.D. (Pp. 111; illustrated. 30s.) Philadelphia and London: J. B. Lippincott Company.

Calcifying disease of the aortic valve is such an arresting discovery at necropsy that its origin has been a matter of debate for centuries. In this monograph Karsner and Koletsky set out to determine the aetiology of the lesion. As a preliminary they have reviewed past researches and opinion. Up to the time of Mönckeberg's classic paper in 1904 most writers had subscribed to the theory of degeneration, but subsequently his view that many of these lesions were consequences of inflammation became prevalent. Analysing the data from their 200 hearts with aortic lesions the authors broadly divided them into a group showing gross rheumatic lesions in addition to the disease of the aortic valve (91 cases) and a group in which the gross lesions were confined to the aortic valve (109 cases). Of the second group 80 showed clear-cut microscopical evidence of rheumatic disease. A further study of the 29 outstanding cases left only 4 in which the evidence of past rheumatism was inconclusive. Careful analysis of their extensive pathological material failed to support the view of Mönckeberg and others that the nature of the disease can be distinguished according to the site of the calcification.

The clinical data emerging from this painstaking survey are interesting and sometimes remarkable. While most clinicians might guess that calcific aortic valve disease is three times as common over the age of 50 as under that age, many would be surprised to know that diastolic murmurs were recorded in fewer than 20% of cases and absence of aortic second sound in fewer than 5%. However, this monograph is essentially based on pathology, and the chapter on specific clinical considerations and the clinical data in general are less impressive than the sections on morbid anatomy and histology. Concluding with the generalization that "with only rare exceptions, calcific disease of the aortic valve is the result of rheumatic cardiac disease," the authors assign to this lesion, which has hitherto been of doubtful origin and meaning, a definite place in pathology and an undoubted significance in clinical medicine.

K. SHIRLEY SMITH.

## ESSAYS IN MEDICAL HISTORY

*No Retreat from Reason, and other Essays.* By Alfred E. Cohn. (Pp. 279. $3.50.) New York: Harcourt, Brace and Company (383, Madison Avenue).

The author of these essays is a veteran cardiologist, and although only four are on primarily medical or physiological topics all are informed with that knowledge of human strength and weakness which an experienced physician who has travelled widely is sure to possess. In the reviewer's opinion Dr. Cohn's lecture on the development of the Harveian circulation is from the literary point of view his best essay. His appreciation of Harvey's greatness, which he puts in the clearest light, never leads him to depreciate the genius of Harvey's remote predecessors. "One must read Galen to appreciate the excellence of the system he instituted, its internal coherence, its consideration of all these and other matters including the change from fetal to the post-embryonic circulation." He praises Harvey as that great man might have wished to be praised.

Dr. Cohn includes three biographical papers—one autobiographical, the others on Simon Flexner and the cardiologist John Wyckoff. These will appeal more to American than foreign readers, because naturally they assume knowledge a foreign reader does not possess. The most ambitious essay—on the difference between art and science in their relation to nature—contains much interesting and acute discussion of the points of view of artists and men of science, but might have been improved by condensation. On p. 140 we read: "No one doubts that science is concerned with the outside, with the physical world, with what is called 'objective reality.'" I should think most pure mathematicians doubt it, and by p. 191 Dr. Cohn seems to doubt it, for he allows that elegance, technical proficiency, and the rules of the craft do have a place of honour in science, and his general conclusions seem to be that it is very hard to draw a line between art and science, that one can hardly go further than to say that, "whereas it was in the nature of science to be general, it was in the nature of art to be individual."

Dr. Cohn is a picturesque writer, sometimes perhaps too picturesque. In speaking of the famous lecture in 1616 at which, according to tradition, Harvey first announced his discovery, Dr. Cohn writes: "A company of great distinction was present. Although they may not have numbered above forty in all from the college, many, of the curious of the town, like Evelyn, Digby, Browne, and Pepys, may have been present." Here the word "like" is significant of much. Pepys and Evelyn were not born in 1616; Kenelm Digby was 13, and Browne (if the great Sir Thomas is intended) was 11. But these are trifles. Those who care for medical and social history will enjoy Dr. Cohn's essays.

MAJOR GREENWOOD.

## GYNAECOLOGICAL OPERATIONS

*Die Gynäkologischen Operationen.* By Heinrich Martius. Fifth edition. (Pp. 424; illustrated. Mk. 58.) Stuttgart: Verlag Georg Thieme. 1947.

Martius's textbook of gynaecological operations has now reached its fifth edition since its first appearance in 1936. Though short, it is of excellent quality, and it is interesting that so good a book can be published in Germany at the present time. It has been translated into English and is well known in America and in India. The style is concise, and anyone who has an elementary knowledge of German can read the book. Martius has based his descriptions on topographical anatomy. References to the work of gynaecologists outside Germany and Austria are scanty: this is particularly noticeable in the sections on the formation of an artificial vagina and operations for stress incontinence. The illustrations are exceptional, for they show great originality, and although many have been modified from well-known drawings almost every one reveals Martius's personality. Most are coloured, and the book compares favourably with even the best of the American publications.

The author adequately describes and illustrates the routine operations, and considers fully the anatomy of the musculature round the base of the bladder and the urethra. He describes an operation for interposing the bulbo-cavernosus muscle between the urethra and the anterior vaginal wall for the treatment of stress incontinence and after the repair of a vesico-vaginal fistula. The accounts of vaginal operations are excellent, and again many of these illustrations show great originality. Very useful practical operative details can be found on almost every page. We can strongly recommend the book, and it is strange that the English translation is not widely known in this country.

WILFRED SHAW.

## PHARMACOLOGY

*A Manual of Pharmacology and its Applications to Therapeutics and Toxicology.* By Torald Sollmann, M.D. Seventh edition. (Pp. 1,132. £2 17s. 6d.) Philadelphia and London: W. B. Saunders Company. 1948.

This standard work, which appears at intervals of about six years, has now reached its 7th edition. It remains one of the most useful reference books on the action of drugs that we have, for the author still follows the literature with great care and assiduity and manages to fit the new information into the book. It now has a larger page and an improved lay-out. It is said that when Prof. Sollmann had the Chair at Cleveland he expected the students to be closely familiar with most of the book. If that is so they must have suffered indeed, for it is essentially a work of reference rather than a textbook. There is little discussion of modern developments of the theory of drug action, and it is evident that the author has in general paid more attention to work in the U.S.A. than to British work. However, this complaint can usually be made against all medical books, for the vastness of the literature obliges the author to select, and it is perhaps natural that he selects the work of his countrymen.

The book nevertheless deserves high praise, and the medical world is greatly indebted to the author for its excellence. It contains in addition to pharmacological information much on the toxic effects of substances used in industry. To provide in one volume well-chosen details about the multitude of substances on which experimental work has now been done is all that is possible to-day.

J. H. BURN.

## BILATERAL RENAL CALCULUS

*Die Beiderseitige Nierensteinkrankheit.* By Dr. Bertrand Bibus. (Pp. 170 ; 40 illustrations. O.S. 60.) Vienna: Verlag Wilhelm Maudrich.

This is the book of a surgeon whose real interest and skill are in the management of those difficult cases of bilateral renal calculus—the indications for operation, the timing of operative intervention, and the choice of which side to tackle first. In all these matters the author obviously speaks with the knowledge and wisdom of experience. He has included sections on the causation of renal calculus and the non-surgical methods of treatment, including the various so-called cures by balneo- and hydrotherapy. Although he himself has little faith in such methods, he is often uncritical and unscientific in this part of the book.

Altogether there is little that can be called new or original here, and the reader finds with disappointment that he is still no nearer to learning the cause of renal calculus. This is a book which the expert urologist may like to read but which does not open up any new territory.

ROBERT PLATT.

## VENEREAL DISEASES

*The Venereal Diseases. A Manual for Practitioners and Students.* By James Marshall, M.D., B.S., M.R.C.S., L.R.C.P. Second edition. With additional information on the use of penicillin. (Pp. 369; illustrated. 21s.) London: Macmillan and Co. 1948.

The second edition of this book differs from the first mainly in the addition of two chapters and further details on the use of penicillin, and by a note on Reiter's syndrome. In the introduction it is stated that two years have elapsed since the publication of the first edition, yet the two editions are dated 1944 and 1948 respectively ; presumably a considerable period elapsed between the preparation of this edition and its publication. It can be said without hesitation that the book is practical and objective and should be of great value to the general practitioner who treats cases of V.D. and also to the venereologist starting training. The illustrations are excellent and the coloured plates beautifully reproduced. The author's views are sound and for the most part accord with modern British ideas. He is enthusiastic about the effect of penicillin in cases of gonorrhoea, but, very properly, cautious about its curative effect on syphilis. He seems to be rather sceptical whether the antibiotic is as effectual when given at longish intervals in a 'delaying base as when given every three hours in a watery solution ; most people think there is little to choose between the therapeutic effects, but the former method is much more convenient in the V.D. clinic and in private practice.

The author is hardly a literary stylist, but he generally succeeds in making his meaning clear, though the sentence (p. 296), "Infectious relapse occurs in 95% of cases by the end of the third year," might be taken to mean that relapse occurred in 95% of all cases. Future editions would be improved if they included more detailed information about BAL and a somewhat fuller discussion of false positive serum tests for syphilis, a subject much in the limelight to-day. Such solecisms as *magna therapia sterilisans* and *flagellae* confirm one in the belief that a study of the classics is still a necessary part of a liberal education.

T. E. OSMOND.

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Fully half of Mr. J. H. Doggart's *Children's Eye Nursing* (Henry Kimpton, 8s. 6d.) is devoted to a clinical exposition of the common diseases of the eye in children. This is followed by chapters on non-operative treatment, instruments and dressings, minor operations, and major operations. The concluding chapter is on the care of school-children. The writing is clear and the teaching orthodox. The text is profusely illustrated.

## BOOKS RECEIVED

[*Review is not precluded by notice here of books recently received*]

***Insects of Medical Importance.*** By J. Smart, M.A., D.Sc., and others. 2nd ed. (Pp. 295. 20s.) London: Trustees of the British Museum. 1948.

Notes and diagrams for the identification of insects.

***Physikalische Therapie.*** By J. Kowarschik. (Pp. 502. 39 Swiss francs.) Vienna: Springer-Verlag. 1948.

A textbook of physiotherapy.

***Submicroscopic Morphology of Protoplasm and its Derivatives.*** By A. Frey-Wyssling. 2nd ed. (Pp. 255. 32s. 6d.) London: Cleaver-Hume. 1948.

An account of the chemistry, molecular structure, and morphology of cytoplasm.

***Sterility and Impaired Fertility.*** By C. Lane-Roberts, C.V.O., M.S., F.R.C.S., F.R.C.O.G., *et al.* 2nd ed. (Pp. 400. 24s.) London: Hamilton. 1948.

Much new material has been included in this edition.

***Snail's Progress. The English Local Prison.*** By C. F. Carter. (Pp. 28. 1s.) London: Penal Reform Committee of the Society of Friends. 1948.

An account of English prisons based on the experiences of Quakers imprisoned during the recent war and since.

***Proceedings of the Seth Gordhandas Sunderdas Medical College Staff Society.*** Meetings 45 to 55 and 56 to 66. (Pp. 247. No price.) Bombay: Seth Gordhandas Sunderdas Medical College 1948

Articles on a variety of medical and surgical topics.

***Blood Derivatives and Substitutes.*** By C. S. White, M.D., Sc.D., and J. J. Weinstein, M.D., B.S. (Pp. 484. $7.50.) Baltimore: Williams and Wilkins. 1947.

An account of their preparation, storage, and therapeutic use, with a discussion of shock.

***L'Exploration Clinique en Oto-Rhino-Laryngologie.*** By G. Portmann. (Pp. 933. 2,500 francs.) Paris: Masson. 1948.

A general account of the examination of the ear, nose, and throat.

***Therapeutic and Industrial Uses of Music.*** By D. Soibelman. (Pp. 274. 16s.) London: Geoffrey Cumberlege 1948

A review of the literature, with discussion and bibliography

***Science in Progress.*** Edited by G. A. Baitsell. 5th series (Pp. 353. 27s. 6d.) London: Geoffrey Cumberlege 1947.

Includes articles by well-known authorities on respiration, cytology, and genetics.

***The Issue of Compulsory Health Insurance.*** By G. W. Bachman and L. Meriam. (Pp. 271. No price.) Washington: Brookings Institution. 1948.

A study of relevant conditions in the U.S.A

***Cosmetic Materials.*** By R. G. Harry. F.R.I.C. (Pp. 479 35s.) London: Hill. 1948.

An account of the physical and chemical properties and dermatological action of cosmetic materials.

***Nursing Pathology.*** By R. H. Goodale, B.S., M.D. (Pp. 416. 15s.) London: Saunders. 1948.

An illustrated textbook for nurses.

***Neuropsychiatry for Nurses.*** By I. J. Sands, M.D. 5th ed. (Pp. 397. 15s.) London: Saunders. 1948.

A textbook of neurology and psychiatry for nurses

***Oxford Science.*** General Editor: F. A. Holland. Vol. 2, No. 1. (Pp. 53. 2s.) London: Mowbray. 1948.

Intended to inform the scientist of recent progress in fields other than his own.

***British Hospitals.*** By A. G. L. Ives (Pp. 50. 5s.) London: Collins. 1948.

A short profusely illustrated account of British hospitals.

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## ORGANIZATION OF CONSULTANTS AND SPECIALISTS

During the past weeks there has been much discussion on how to represent the interests of consultants and specialists in the National Health Service.[1] The need for an official machinery through which such representation can be made is not, of course, disputed. For the first time consultants and specialists have been faced with a problem familiar to general practitioners working under the National Health Insurance scheme for over thirty years. During this time much of the medico-political work of the B.M.A. has been concerned with the terms and conditions of service under the National Health Insurance Acts. For this reason these matters have loomed large in the debates of the Council and the Representative Body. And for this reason, too, general practitioners have been far more active in the work of the Association than have consultants and specialists. To meet the new need of specialists for representation of their interests as the result of the coming into force of the National Health Service Act, the B.M.A. quickly evolved a new mechanism by setting up regional and central committees through which consultants and specialists could organize effective representation and action on all those matters which will affect them in the Service. Some specialists have feared that their freedom of action in this field of work might be interfered with by a Council or Representative Body in which the interests of general practitioners are thought to be predominant. Those who express this fear fail to take into account the evolution of organized medical services in this country, or to allow for the continued development of the B.M.A.'s organization now that the whole of the medical services of Britain have undergone radical transformation. The Royal Colleges and the Royal Scottish Corporations have in the past functioned as academic and examining bodies. Since 1942 they have been inevitably drawn into the more controversial field of medical politics. Those in control of the Colleges and Corporations have been faced with a difficult decision —whether to continue to restrict their interests to academic work, or whether to enlarge them by taking an active part in medical politics. Those who are properly jealous of the traditions of these ancient pillars of Medicine have been anxious lest they should, by taking on functions that may involve them in medico-political controversy, lose the essence of the tradition which has made them what they are. Those with a more material concern in the economy of effort in a profession insufficiently manned for the National Health Service deplored the possible emergence of a new medico-political organization for consultants in the presence of an experienced organization to which some 80% of the profession already belong.

Here then was a situation in which conflict of opinion might become acute. It is a tradition of doctors to disagree, but rarely to fratricidal lengths. An important step to solve tension and provide solution of the problem consultants and specialists are faced with was made on July 28 in a conference, presided over by Sir Lionel Whitby, President of the B.M.A., between representatives of the Royal Colleges, two of the Royal Scottish Corporations, and the British Medical Association. An agreed statement on the outcome of this conference is printed on page 351 of this issue. This highly important move is to be welcomed as a rational approach to finding an answer to the question of how best the interests of consultants and specialists shall be upheld in the National Health Service. An exploratory committee under the chairmanship of Sir Lionel has been set up to reach agreement on the three propositions submitted to the bodies represented at the conference. The first proposal is that a joint committee of the Colleges, the Corporations, and the B.M.A. shall be established to advise the Minister of Health on all matters affecting consultants and specialists. The second proposal is that the two existing committees—of the Colleges and the Corporations, and the Central Consultants and Specialists Committee of the B.M.A.—should continue as such to brief the Joint Committee. It will be essential to determine exactly to what extent these different committees shall take independent action, to define those matters in which they shall be autonomous. The third proposal of the conference, therefore, is that the Joint Committee shall clear this ground. It is desirable that the range of autonomy for the different organizations should be made unambiguous as soon as possible. Only by a clear definition will future misunderstanding be avoided and the interests of consultants and specialists be represented in a way that will facilitate prompt and effective action. The size of a problem, whether academic or medico-political, may determine the agency through which it should be tackled. For example, any big issue which may face consultants and specialists might be most appropriately dealt with by the Joint Committee representing the combined forces of the Colleges, the Corporations, and the B.M.A. But on the basis of its experiences in the National Health Insurance the B.M.A. would seem to be the most appropriate organization for dealing with the greater part of those matters coming under the heading of "terms and conditions of service." The supremacy of the Colleges and Corporations in academic medicine is undisputed.

The proposals put forward by the conference point a clear way out of a tangle of interests and of conflicting opinions. Given good will, and the evident desire on the part of everyone to reach a reasonable and friendly agreement, it should be possible through combined administrative experience and trained scientific thinking to isolate those facts in the situation which are important, to reject considerations which are irrelevant, and to put this matter of representation of the interests of consultants and specialists on a sound professional foundation.

[1] See *British Medical Journal*, 1948, 1, 985, 1140, 1189; 1948, 2, 31.

## RECENT WORK ON THE Rh FACTOR

Theoretical aspects of the Rh factor and continued controversy on the nomenclature tend to obscure the steady advances which are taking place in the clinical application of knowledge already possessed. It should, moreover, be realized that these practical applications only very rarely require a knowledge of the finer theoretical points, important as these are to specialist laboratories and to the professional geneticist. Indeed, there is still much scope for clinical research on the Rh factor conceived in the original terms of simple Rh-positive and negative.

For some years clinicians and pathologists have been aware of the danger of giving transfusions, incompatible with regard to the Rh factor, to persons whose history suggests that they have been immunized to Rh either by transfusion or by pregnancy. Even in the absence of a history of immunization transfusion of blood of unknown Rh type into a woman of unknown Rh type may lead to grave results. This has not been so widely realized because the ill-effects may be long delayed. It is now known that in most, if not all, cases in which the first child is affected by haemolytic disease of the newborn the mother will be found to have had a previous transfusion. Many cases have come to light in which as a result of immunization by transfusion the mother has become unable to bear even one live child to her Rh-positive husband. It has indeed been suggested that the present increasingly frequent diagnosis of haemolytic disease of the newborn is not solely the result of improved facilities for investigation but is to a considerable extent due to the great increase in the use of transfusion which has taken place since 1939. Unfortunately, during most of this period the importance of Rh incompatibility was imperfectly appreciated.

Drs. G. Discombe and H. O. Hughes, in a paper appearing elsewhere in this issue (p. 329), have thus performed a valuable service by drawing attention to reports which show how readily transfusion can produce Rh immunization and by supporting with statistics their opinion that the previous transfusion of mothers probably causes haemolytic disease of the newborn. They found that, whereas only 2% of unselected mothers at an antenatal clinic had had a transfusion, 36% of mothers of babies with haemolytic disease had been transfused. It can hardly be doubted that in most of the transfused mothers it was the transfusion which was the main cause of the disease in the child.

If further statistics should support these very striking figures it will be possible to state that about one-third of all the cases of haemolytic disease of the newborn at present occurring in this country are due to indiscriminate transfusion of mothers. Such transfusion must have a significant effect on the total infantile mortality of the country. It therefore ought to be a rigid rule that every female requiring transfusion, who has been or who may become pregnant, should be Rh tested. Hetero-haemotherapy of little girls, a procedure known to produce lasting immunization, ought probably never to be performed. Ideally, indeed, every recipient of a transfusion, whether male or female, should be tested and receive Rh-compatible blood. The National Transfusion Service deserves every credit for its persistent encouragement of the Rh testing of all expectant mothers and transfusion recipients, but the responsibility for demanding Rh tests and seeing that only compatible blood is transfused lies primarily with the clinician in co-operation with the hospital pathologist. Limitations of supply preclude the easy way out of giving Rh-negative blood to untested patients.

It is not, however, sufficient that a clinician or hospital pathologist should be aware of the necessity for Rh testing or for the giving of Rh-negative blood; it is also necessary that the testing serum, or the blood, should be available. While it is only with the greatest of difficulty that sufficient Rh-negative blood can be made available for those cases known to need it, it is probable that few, if any, fail to receive Rh-negative blood if their need is known. On the other hand, the lack of Rh-testing serum is undoubtedly preventing much Rh testing which ought to be carried out. This state of affairs would be largely, if not wholly, remedied if every patient having a serum suitable for testing purposes and being in a fit state to give blood were given the opportunity of offering to make a contribution. Only by full co-operation between patients, clinicians, pathologists, and the transfusion service can this be brought about. At present a small though increasing number of enthusiastic medical officers are doing their best to maintain a supply for the whole country.

While it is probable that adequate arrangements for the collection of blood would produce a sufficient quantity of the relatively common types of serum needed for routine testing, there will probably always be a lack of the rarer types of serum required for special tests and for research. It may be necessary to look to the immunization of volunteers for this purpose. As more and more women known to have weak antibodies in their serum pass the menopause it will become justifiable to ask them to submit to further artificial immunization and to act as donors of serum, but it may be necessary meanwhile to look to male volunteers who have not previously been immunized. The investigations into the mechanism of Rh immunization reported by Dr. J. J. van Loghem on another page are therefore of great practical value quite apart from the light which they may throw upon the mechanism of pregnancy immunization. Fourteen volunteers who had failed to respond to simple Rh immunization (by injection of appropriate red blood cells) received in addition injections of killed typhoid and paratyphoid bacteria. Three of them showed clinical signs of sickness and a rise in temperature. These, and these only, then produced Rh antibodies. Since van Loghem was using the relatively weak C and E antigens the proportion of responses must not be compared with the response in the same or other conditions to the powerful D antigen. Van Loghem has thus discovered a very useful technique for those who are attempting to prepare Rh antibodies in volunteers.

While successive theoretical advances in Rh research do not directly concern the clinician, their effect is in many cases to render transfusion potentially safer by eliminating rare but nevertheless dangerous types of incompatibility.

1 *La Maladie Hémolytique du Nouveau-Né*, 1947. Paris.

It thus becomes more and more important that when an anti-Rh serum has been obtained from an immunized mother or from some other source its constituent antibodies should be determined before it is used for routine testing. These necessary preliminary tests are beyond the scope of most laboratories, and the serum should be submitted to a specialist laboratory such as a regional transfusion laboratory or the Blood Group Reference Laboratory.

Professor D. F. Cappell's wide experience of both the clinical and pathological aspects of haemolytic disease gives special value to his survey of the Rh factor which appears on page 323 of this issue. It has been widely held that the first one or two affected children in a family show only mild symptoms, but Cappell has found that the first recorded manifestation of the disease is usually one of the severer forms. Bessis[1] has published details of a large number of families, and, while in many of them the first affected child suffered from icterus gravis, in others there was a progressive development of symptoms from one child to the next. Again, in the case of the incidence of cerebral damage and its response to transfusion, Cappell disagrees somewhat with previous workers and is of the opinion that such damage can in most cases be prevented by early transfusion.

In such matters as these the truth can be reached only by combining the observations of experienced workers; all who have access to large numbers of cases and are able to study them fully are under an obligation to publish their results. In many other matters connected with the Rh factor our clinical knowledge is inadequate; in particular more information is needed on the relation between parity of mothers and the time at which they first become immunized. This is a matter which can only be settled by combining the results obtained in large numbers of antenatal clinics.

## MENTAL HEALTH

In a world full of unrest, anxiety, and the mutterings of aggression the imaginative boldness of some outstanding medical men and organizations comes as a refreshing contrast to the futile bickerings of power-hungry politicians. It is, for example, a medical man, Sir John Boyd Orr, who has been the driving force behind the Food and Agriculture Organization (F.A.O.). Faced with one discouraging situation after another,[1] he yet retains his optimism that the nations of the world may yet show as much concern about the feeding of the 2,500 million people in the world as about feeding the 2½ million people in Berlin. As a result of Sir John's persistence a World Food Council has been set up. The conjoined attempt of medical men to promote world health through WHO is another example of inspired effort. And now comes the attempt to see what mental science can do for *Homo* optimistically called *sapiens*. A year and a half ago Dr. G. Brock Chisholm, talking of the obligations of WHO in the sphere of mental and social health, said that WHO must derive its technical authority from the International Congress on Mental Health, the Congress which began its ten-day discussions on Wednesday of this week. Those responsible for organizing this did not shirk the challenge, and in a statement of objects made shortly after Dr. Chisholm's speech asserted roundly that "the general theme of the Congress will, therefore, be the psychological tasks involved in preparing the way for individuals to become citizens of the world." There is, perhaps, something naïve in this sentence, shorn of all qualifications and conveying to the reader the suggestion that those who framed it could scarcely have glanced over their shoulders at the past history of mankind. There is in these ambitious programmes a certain fine impatience with the impotence of the politician to deal with first things first, and as doctors we may be proud that through the specialized agencies of the United Nations medical men are trying to break down the customs barriers set up against health and knowledge.

The ground for the International Congress on Mental Health has been most carefully prepared by a series of commissions on the topics to be discussed. These commissions have been at work in Great Britain and in other countries so that the discussions now taking place can be of the fullest value to those attending and participating in them. This technique might well be adopted by the organizers of other international medical congresses. The present one is, in fact, a triad of three conferences—namely, on child psychiatry, medical psychotherapy, and mental hygiene. The first is focused on aggression, the second on guilt, and the third on psychological problems of the group. This sequence follows the aim of the organizers to apply to group, national, and international problems knowledge gained in the understanding and management of individual psychology. When he spoke about the conference in May of last year Dr. Chisholm, seeing the significance of such an event, nevertheless asked this question: "Are psychologists and psychiatrists themselves individually and as a body able to do what I have just suggested? Can they, in fact, agree on anything?" And he went on to observe that it would be disastrous if the Congress were to "turn out to be a discussion of obscure psychological dogmata, or a conflict between various schools."

Speaking at the recent meeting in Edinburgh, reported elsewhere in this issue, Professor E. D. Adrian observed that neurologists, neurosurgeons, and physiologists are working on one side of a high wall and psychologists on the other. But he added that efforts were being made to break this down. Some demolition is needed on the psychological side too. Nevertheless, there is now a body of observed facts and some agreement among the schools on some of the hypotheses holding the facts together. To wait until knowledge of psychology is on a firmer ground of fact and theory before attempting to apply what is known on the ambitious scale the Congress has given itself might be to move in the direction of strict scientific caution; but to attempt what to some may seem to be the impossible brings with it at least a note of optimism in a world drenched with pessimism; and, so long as too much is not expected, much may be gained as the result of the discussions going on this week and next.

[1] See *The Listener*, Aug. 5, 1948.

## PROTECTING CHILDREN FROM TUBERCULOSIS

A recent question[1] in Parliament was aimed at finding out if the Ministry of Education now held any views about the employment of tuberculous teachers in schools different from the advice given in a joint memorandum[2] issued in 1927 by the Ministry of Health and the Board of Education. The Minister of Education informed the questioner that education authorities had again been reminded of the instructions in the memorandum. Since the document referred to was published over twenty years ago, long before mass radiography was practicable, and is now out of print, the present position can hardly be considered satisfactory, and the recent publication of a report[3] by the Children's Committee of the Joint Tuberculosis Council is timely.

The report is concerned with the means of protecting organized groups of children from the risk of infection by adults suffering from tuberculosis. These are its most important recommendations: (1) No person with pulmonary tuberculosis should be allowed to accept employment involving close contact with children until the disease has been certified as arrested. (2) All persons whose employment brings them into contact with groups of children should be medically examined at the time of their engagement, including *x*-ray examination of the chest, which should be repeated annually. (3) An employee found to be suffering from pulmonary tuberculosis should cease work immediately, and not be allowed to return to work until two medical certificates have been submitted, the first stating that the disease is no longer active and the second, after a further six months, stating that the improvement has been maintained. On returning to work the employee should be examined at three-monthly intervals for the first year and at six-monthly intervals for the next two years. (4) An unusually high incidence of tuberculous infection in a group of children should lead at once to a full investigation of the staff employed.

These recommendations are not of course intended to apply only to school teachers, but it is probable that local education authorities will be more interested in them than other public bodies. The problem of the school teacher who develops pulmonary tuberculosis and wishes to return to his or her previous employment is no easy one, and the strict enforcement of the Board of Education's old rule (which is similar to the first part of recommendation 3 above) has led to the disappointment and resignation of many good teachers who, even though successfully treated with artificial pneumothorax, may find it impracticable to remain unemployed while waiting for the required certificates. No doubt some of these have found work in private schools, and it is to be hoped that those responsible for such schools will have a chance of studying the recommendations of the Children's Committee, which in any case are certain to receive the support of the school medical officers of local education authorities.

The report draws attention to the fact that in the past it has not been the practice to seek the source of tuberculosis in an infected child in the school which he attends, nor to investigate the school contacts of any teachers who may be discovered to have developed the disease. Hyge[4] has shown the dangers of this omission. In a State school for girls near Copenhagen in 1943 an influenza-like epidemic broke out almost explosively. A full investigation showed that 47 of the girls had developed pulmonary tuberculosis. The source of infection in all probability was a teacher in whom the presence of pulmonary tuberculosis had not been recognized. An epidemic of tuberculosis in the Faroe Islands has also been reported[5] recently; in this 22 patients were infected by a single girl. It is possible that the carrying out of the final recommendation of the Children's Committee of the Joint Tuberculosis Council might bring to light similar outbreaks in this country

[1] *British Medical Journal*, 1948, **2**, 232.
[2] *Closure of and Exclusion from School*, 1927. London: H.M.S.O.
[3] *Report of the Children's Committee*, 1948. Joint Tuberculosis Council, London.
[4] *Acta tuberc. scand.*, 1947, **31**, 1.
[5] Poulgen, A., ibid., 1947, **31**, 58.

## NEW FACTORS IN SHOCK AND HYPERTENSION

In a series of papers a group of workers from Cornell University Medical College report the results of their investigations into certain of the problems of shock and hypertension. They have demonstrated the existence of two hitherto unrecognized blood-borne vasotropic substances which they have named vaso-depressor material (V.D.M.) and vaso-excitor material (V.E.M.). These substances are assayed by the following technique.[1] A rat meso-appendix is prepared for observation of its vessels; increasing concentrations of adrenaline are applied locally and the response of arterioles of a certain size is noted. The concentration of adrenaline needed to induce certain alterations in the circulation is taken as an end-point. The material to be tested—e.g., plasma—is now injected into the tail vein of the rat, and the adrenaline sensitivity is reassayed. They find that this indirect technique based on the response to adrenaline is more reliable than directly observing the alterations in circulation in the meso-appendix that accompany the alterations in sensitivity to adrenaline.

V.D.M. depresses the responsiveness to adrenaline, causes diminished frequency of vasomotion (contraction and relaxation) of the metarterioles and precapillaries, slows capillary circulation, and may cause a fall in blood pressure. V.E.M. has the converse action and stops the circulation in some capillaries.[2]

The blood of animals (rats, rabbits, and dogs) in which shock was induced by tourniquet, leg pounding, Noble-Collip drum, and by haemorrhage showed alterations, which could be repeated, in the blood content of V.E.M. and V.D.M. as shock developed. When the animal was in mild or early shock its blood caused a 10- to 20-fold increase in adrenaline sensitivity on test preparations (V.E.M. activity). Later the adrenaline sensitivity fell to well below that found with control animals, and this rise in V.D.M. activity was associated with the development of irreversible shock which no longer responded permanently to fluid replacement therapy. By assaying extracts of organs of animals killed during various stages of shock[3] it was shown that V.E.M. is produced only by the renal cortex, while V.D.M. is produced by the liver and to a less extent by the spleen and muscle. The same workers also isolated the substances from these organs when they were incubated under anaerobic conditions. When incubated aerobically kidney destroyed V.E.M. and liver destroyed V.D.M. and to a less extent V.E.M.

Mazur and Shorr[4] have prepared V.D.M. in a partially purified state such that 0.1 gamma can be easily assayed. It is apparently a protein of molecular weight 10,000 to 15,000, and iron appears to be an essential part of the active molecule. Less is known about V.E.M., but it appears to be distinct from renin or angiotonin.[5] Because of the circulatory change that V.D.M. causes, it seems likely that it plays a part in the development of shock, but, as Chambers and Zweifach[1] themselves point out, so do other factors.

[1] Chambers, R., and Zweifach, B. W., *Amer. J. Physiol.*, 1947, **150**, 239.
[2] Shorr, E., *Amer. J. Med.*, 1948, **4**, 120.
[3] Shorr, Zweifach, Furchgott and Baez, *Factors Regulating Blood Pressure*, 1947, p. 32. Josiah Macy, Jr., Foundation, New York.
[4] Mazur and Shorr, ibid., p. 53.
[5] Furchgott and Shorr, ibid., p. 60.

In an extension of this work Shorr *et al.*[3] have shown that the kidneys produce V.E.M. under the same circumstances as they produce renin in experimental Goldblatt hypertension, but there is an important difference in that V.E.M. can be demonstrated in chronic experimental hypertension whereas renin cannot, for it apparently disappears with the acute phase. A curious and as yet unexplained finding is that V.D.M. is also produced in chronic experimental hypertension and masks the V.E.M. activity. To demonstrate the V.E.M. it is necessary to incubate the plasma aerobically with liver to destroy the V.D.M. Of great interest is the finding by this technique that 12 patients with essential hypertension had raised amounts of V.E.M. and V.D.M. in the blood. What part, if any, these substances play in the genesis of essential hypertension remains to be seen, and this work raises the hope that the actions of V.E.M. may explain much that those of renin have failed to do.

## GENETIC COMPONENT OF LANGUAGE

In a recent paper C. D. Darlington[1] has made an original and thought-provoking contribution to the study of human genetics. He starts by emphasizing the importance of differences in language in maintaining mating barriers among human beings. Though a new language may be imposed upon subject peoples, and the stems of words and to a lesser extent grammar may remain relatively fixed, the phonetic complement—the sound equipment of a people—may reassert itself. There is evidence to show that this sound complement may well depend, at least in part, upon genetic constitution. The new speakers change the language in order to fit their preferences in sound production. There is no need to postulate any great difficulty—simply this measure of inborn preference: ". . . the tongue which prefers and adopts, and the ear which later approves, the easy course."

The simplest European variation which can be traced over the centuries with considerable accuracy is the presence or absence of the Th sound. This sound was present in the common ancestral Indo-European language. It expanded westwards, where it met a Th-speaking Basque zone, and in the East it met non-Th-speaking peoples. Later there were successive movements into Europe from the East of peoples who did not have Th. In eastern Europe this sound was lost in prehistoric times. From 300 B.C. to 1400 A.D. the loss spread from Italy through France and Germany to Sweden. To-day in Europe Th persists only along the fringe—Iceland, Great Britain, Spain and Greece, being retained to a variable extent in western Norway, Denmark, and a few smaller outlying areas. The remarkable point that Darlington brings out is that maps showing the distribution of Th and of the ABO blood groups correspond with a faithfulness that is startling. It should be explained in passing that Darlington relies on the distribution of blood-group gene O. Previous writers have almost invariably prepared maps showing variations in gene A and in gene B, gene O being left as the unmapped difference. Apparently this has served to obscure the kind of relationship now brought out. It is true that Haldane[2] used triangular co-ordinates for plotting the three gene frequencies simultaneously, but this is a device which is not readily understood by the non-mathematical. Darlington's maps show that with little exception the peripheral European zone from Iceland to Greece has 65% to 75% of gene O and also possesses Th. The intermediate zone with O ranging from 61.5% to 64.5% stretches from Sweden to France and corresponds to the area where Th was once present but has now been lost. The main eastern zone and the Portuguese sector of the Iberian peninsula have less than 61.5% of O and never had Th. The only exception to complete correspondence in the maps is that Italy and Holland have not retained Th.

The contrast between Portugal and Spain in both maps is particularly striking. On the one side we see 61% gene O and complete absence of Th; on the other 65–69% gene O and a determined reintroduction of Th after a period of conquest by a non-Th people. The gradient between Greece and her neighbours is also sharp—56% gene O and no Th on one side of the mountain barrier, 68% gene O and Th on the other. The finer differences in the British Isles are in conformity with the association. The maxima of both variables occur in Ireland, falling through Scotland and Wales to northern England and finally to minima in the south-east, where Th tends to be replaced by D in Kent and by V or F in London. Apparently the oldest non-Th speakers remain as the outermost fringe of all—i.e., in Portugal. There is also a region of variable Th in western Ireland. The Th speakers in turn have been pushed outwards by the non-Th speakers from the east. Phonetics, blood groups, and history are all in harmony and point to the same conclusions. It is clear that Dr. Darlington has produced weighty evidence for a genetic component in language and has called attention to methods of study in human and population genetics that should yield very valuable results in the future.

[1] *Heredity*, 1947, **1**, 269.
[2] *Hum. Biol.*, 1940, **12**, 457.

## INDEPENDENT DOCTORS

Lord Horder, in a recent letter,[1] criticized the Council for its handling of the situation which developed after April 7. He said: "There are many doctors asking for guidance, not only for themselves but for their sons and daughters thinking of medicine as a vocation." And to these he added many members of the public and "men who will leave the Service they have too hastily joined out of fear and not conviction." Lord Horder went on to invite readers to send him their views privately. According to a long report in the *Observer* of Aug. 8 consultants and general practitioners have begun discussions in London this week "to create an organization for doctors who have chosen to remain outside the National Health Service." According to the *Sunday Times* this is the outcome of the letter Lord Horder, who is to take part in the discussions, wrote to the *Journal* on June 19. Lord Horder is reported to have said to the *Sunday Times* correspondent that as he was a member of the Council of the B.M.A. he would "hesitate before setting up another body outside that organization." The *Observer* states: "Those who will take part in this week's discussions consider that the independent doctors must be organized for mutual protection and assistance, and must be ready to assist the B.M.A. in any future opposition it may give to further State encroachments on the traditional practices of the profession and essential rights of its patients." According to this newspaper many of the independent practitioners believe that increasing numbers of patients will seek medical attention outside the scheme, and believe, too, that the Government will welcome their assistance.

It would seem improbable that Lord Horder would signalize his first year in office as a member of the Council of the B.M.A. by helping to create an organization outside it. If those taking part in this week's talks feel that some kind of "watch committee" is necessary to represent the interests of those staying outside the National Health Service there would appear to be no reason why such a committee should not be set up for this purpose in the B.M.A.

[1] *British Medical Journal*, 1948, **1**, 1208.

# PERITONEOSCOPY

BY

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My object in writing this brief article is to make a plea for the wider use of the peritoneoscope. Although the possibility of peritoneoscopy as a method of examination of the abdomen has been known for many years it has been used surprisingly little in this country. Indeed, it is remarkable that it has not become one of the standard endoscopic methods used in every hospital where general medical and surgical work is done. I have most frequently gained help from the peritoneoscope in the diagnosis of disease of the liver and in recognizing metastases in the abdomen. Clinically it is often difficult to distinguish between a malignant liver and cirrhosis; but by the comparatively simple procedure of peritoneoscopy the diagnosis is easily settled. By the same means metastases can readily be recognized in the omentum, intestines, parietal peritoneum, etc.

It is an everyday experience for the abdomen to be opened for exploration of a carcinoma and to find metastases in the liver or elsewhere. The surgeon has carried out an unnecessary operation and is as deserving of blame as if he had explored a bladder without first cystoscoping the patient. It is not so many years since I witnessed a surgeon (inexperienced in the use of the cystoscope) opening a bladder to remove what he from the radiographs thought was a stone, when really the case was a beautiful example of calcification in a uterine fibroid. The crime of opening the abdomen and finding the case inoperable owing to the presence of metastases is committed daily in this country by surgeons inexperienced in the use of the peritoneoscope.

I would urge most strongly, therefore, that surgeons should become as familiar with the use of the peritoneoscope as they are with the cystoscope. It is undoubtedly easier to interpret the view seen in a peritoneoscope than that seen in a cystoscope or gastroscope, yet it remains a most singular fact that extraordinarily little attention has been paid to peritoneoscopy.

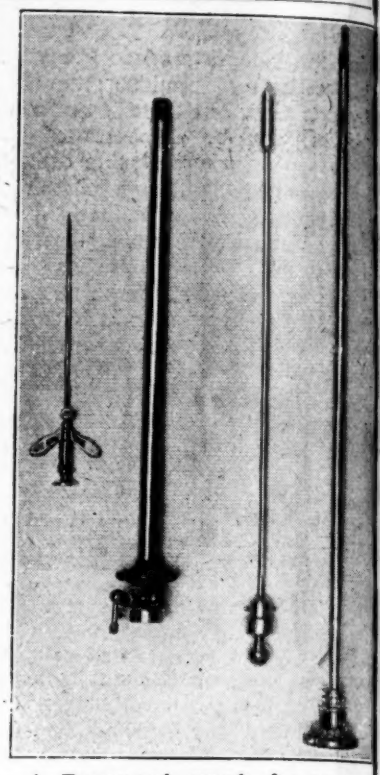
## History

Kelling in Germany in 1910, using a cystoscope, was the first to report an attempt at peritoneoscopy, the instrument carrying its own light—although Ott, a Russian, in 1901 was the first to look into the peritoneal cavity through a small opening, but he used a speculum and head-mirror. Various further makeshift peritoneoscopies were done, using cystoscopes, sigmoidoscopes, etc., but it was not until Ruddock, of Los Angeles, published his papers in 1934 and 1937 describing his peritoneoscope that a wider interest in the subject was aroused. Since then many papers have appeared in the American medical literature, but very little has been written on the subject in this country: the first to make an important communication were Prof. Milnes Walker, of Bristol, and Mr. Playfair in 1942. Peritoneoscopy was the main subject of the evening at a meeting of the Royal Society of Medicine in 1943, the opening speakers being Prof. Milnes Walker and Dr. Cooke, of Oxford, who clings to the name laparoscopy. I can find no article on peritoneoscopy in the *British Medical Journal*, except a brief note on the subject in 1925 by Rendle Short, who used the word "coelioscopy" and employed a cystoscope.

## Technique

The procedure consists in distending the abdominal cavity with air, which is introduced through a cannula inserted with the help of a trocar a little distance above the pubes in the midline. The abdomen is fairly tightly distended so that the abdominal wall is firm. An incision about 1/4 in. (0.6 cm.) in length is then made a little distance below the umbilicus in the midline, and the peritoneoscope, held very firmly, is slowly pushed through into the peritoneal cavity. The air has lifted the abdominal wall away from the intestines and omentum so that these are not injured if reasonable care is taken. The introducing trocar of the peritoneoscope is then withdrawn from the sheath, and the telescope, which carries a light on its end, is passed down the sheath, into which it fits with an airtight washer. The examination of the cavity then proceeds.

I have used a Ruddock peritoneoscope since 1938 on numerous occasions, about an equal number of examinations being done under local analgesia and general anaesthesia. Intravenous thiopentone is quite satisfactory as a general anaesthetic. Under procaine local analgesia many patients do not complain at all, though others resent the abdominal distension with air, and a few experience some pain when the instrument rubs against the parietal peritoneum as it is moved about inside the abdomen. When the examination is finished as much air as possible is let out through the sheath, which is then withdrawn, and the tiny opening is closed with one stitch. There is no need for the patient to remain in hospital.



1, Trocar and cannula for pneumoperitoneum. 2, Outside sheath of the peritoneoscope. 3, Trocar for introducing the sheath. 4, Telescope.

The procedure is carried out in an operating theatre with full aseptic ritual, and it is of much convenience to have a table which tilts into the Trendelenburg and reverse Trendelenburg positions. The instrument is inserted below the umbilicus because this makes it easy to see both sides of the upper abdomen by passing it first on one side of the falciform ligament and then on the other. Adhesions may cause trouble in moving the peritoneoscope about. It is dangerous to insert the instrument into the abdomen close to a previous incision, as intestine may be adherent to the abdominal wall at this point and so be injured.

The information that can be derived from the view obtained is of course not by a considerable measure so great as that which can be got from a laparotomy. Only the anterior surface of the structures in the anterior part of the abdomen can be seen, though by inserting a slim straight metal rod through a separate puncture in the abdominal wall the edge of various structures can be raised and a view obtained under them. Information of the greatest value can, however, be obtained. It is possible to see nearly the whole of the liver, the fundus of the gall-bladder, the anterior wall of the stomach and most of the colon, the omentum, much of the small intestine, and the parietal peritoneum. The spleen is difficult to see unless it is enlarged; and only very seldom can the appendix be seen. In a steep Trendelenburg position one can often inspect the depths of the pelvis, though sometimes the small intestine will not come up out of the way.

Complications of peritoneoscopy are insignificant. The majority of patients have no after-effects whatever. A small area of surgical emphysema appears around the puncture site in an occasional case. In only one case was it at all extensive, spreading to most of the abdominal wall; in a few days it subsided without any untoward result.

When introducing the preliminary trocar and cannula for the pneumoperitoneum care has to be taken to make sure that it has gone through the parietal peritoneum as well as the linea alba. Sometimes the peritoneum is very loosely attached to the abdominal wall and gets pushed forward, with the result that when air is pumped in it strips the peritoneum up over a

very wide area and causes an internal surgical emphysema : this makes further examination most difficult. No instance of injury to gut or viscera has occurred in any of my cases and in none has there been haemorrhage or sepsis.

**Summary**

A strong plea is made for more frequent use of the peritoneoscope. The technique and the application of peritoneoscopy are briefly outlined.

# INTERNATIONAL CONGRESS OF PSYCHOLOGY

## MEETING IN EDINBURGH

The Twelfth International Congress of Psychology, originally planned for 1940, was held in Edinburgh from July 23 to 29, and was attended by over 600 members from most European countries, the United States, Canada, China, India, Chile, and elsewhere. The programme covered a wide range of subjects, with the main emphasis on cerebral function, social and industrial psychology, and child psychology. One of the striking features of the discussions was the high proportion of time devoted to the borderlands between physiology, neurology, and psychology. As Professor Adrian said, the neurologists, neurosurgeons, and physiologists were working on one side of a high wall and the psychologists on the other. It was clear, however, that determined efforts were being made in several countries to break this wall down and to link psychological concepts to neurological findings.

Professor SYDNEY SMITH, acting Vice-Chancellor of the University of Edinburgh, welcomed the members of the Congress on July 23, and expressed great regret that Professor Emeritus James Drever, president of the Congress, was unable to be present owing to illness. In his absence the inaugural address was read by his son, Professor JAMES DREVER, and took the form of an interesting historical survey of the development of philosophy, or introspective psychology, in Scotland during the past two centuries, from David Hume's treatise on *Human Nature* in 1739 to the present time.

### Cerebral Function

Professor E. D. ADRIAN spoke on the physiological mechanisms of the brain. He said that, though neurologists and neurosurgeons had most to say about recent developments in the physiology of the nervous system, a description of some of the general reactions of nerve cells and the activity taking place in them was of interest to psychologists. Most important was the great amount of activity in the nerve cells that made up the higher levels of the nervous system. There was a constant cycle of physical changes, and the mechanism of rhythmic discharge was highly developed with a wide range of frequency. The stimulus of the sensory endings caused instability sufficient to give a continuous discharge of low frequency. In the brain constant activity was the rule. Although greatly reduced by an anaesthetic or sleep, it could be brought back by a single stimulus. (This was demonstrated by amplified recordings from the olfactory bulb of a fully anaesthetized rabbit). There was some evidence to show that consciousness (behaviour) depended on the cells of the brain having some degree of instability, which made them of constantly changing receptivity. The cells of the cortex had a spontaneous constant changing activity. At a lower level, in the spinal cord, there was less evidence of changing activity—reflex centres must behave with complete obedience to orders. The cells of the brain were not so obedient, conscious activity being less predictable.

Professor O. L. ZANGWILL (Oxford) dealt with the subject of visual orientation in relation to cerebral dominance. It had long been known that lesions involving the parieto-occipital region of the cerebral cortex were liable to provoke marked and characteristic disturbances of visual space perception. The principal types of disability hitherto described were (*a*) visual disorientation, which might be complete or incomplete according to whether the responsible lesion was bilateral or unilateral ; (*b*) disturbances in visuo-spatial articulation and in the appreciation of high-grade spatial relations in the visual field ; and (*c*) distortion of the main co-ordinates of visual space. Disorders of the second and third type were particularly common in cases with right-sided parieto-occipital lesions, and he tentatively suggested that some mechanism of special significance for visual space perception was located in the minor hemisphere. Preliminary evidence in support of this view, based on the comparative psychological study of cases with right-sided and those with left-sided parieto-occipital lesions, was discussed in some detail. The relation of visual object-agnosia to lesions of the dominant hemisphere, and of topographical memory loss to lesions of the minor hemisphere, was also briefly considered. In the light of the available evidence Professor Zangwill concluded that object and colour recognition, and the simultaneous grasp of a complex perceptual field, appeared closely bound up with the activity of the dominant hemisphere, whereas the general framework of spatial relationships seemed to depend to a much greater extent on the contribution of the minor hemisphere. It appeared, therefore, that the principle of cerebral dominance applied to some at least of the processes subserving visual cognition in general.

### Electroencephalography

Dr. T. C. BARNES (Philadelphia) described the physiological and psychological factors in electroencephalography. There were many physical, chemical, and psychological conditions that affected brain-waves. It was probable that the electrical activity of the brain was produced by phase-boundary potentials generated by acetylcholine at the interface between brain lipoid and tissue fluid. This cholinergic theory suggested that parasympathetic activity might be associated with increased electrical activity of the brain, and, conversely, that signs of sympathetic activity might accompany decreased activity. Also, the vasodilatation of cerebral vessels produced by acetylcholine might promote bio-electrical potential. Evidence for this theory was found in the following investigations. In a group of normal persons whose E.E.G. became abnormal on hyperventilation the skin temperature of the hand fell an average of 1.6° C., and pulse rate rose 35 beats, compared with an average fall in skin temperature of only 0.6° C. and pulse rise of 23 beats in normal persons whose E.E.G. was unaltered by hyperventilation. These results supported the theory of parasympathetic control of the encephalogram. In addition to physiological studies it had been found that psychological tests also aided in the interpretation of the E.E.G., and it was useless to record brain-waves without careful study of all possible cholinergic and psychogenic elements. (Throughout the reading of this paper many of the points were strikingly illustrated by a volunteer who was connected to an electroencephalograph, the resulting record being circulated as a continuous tape among the audience.)

### Prefrontal Leucotomy

In a symposium on this subject a paper by Professor G. JEFFERSON (Manchester) was read by a deputy. After a review of the beneficent effects of lobectomy in lesions of the frontal lobe, and a discussion of frontal lobe function, the effects of leucotomy were considered. Bilateral frontal lobe damage, whether caused by tumours, injury, or lobectomy, gave rise to certain faults such as lack of initiative, lack of normal inhibition in emotional behaviour, and inability to learn new tasks. These faults were also liable to occur after leucotomy, but fortunately the changes were not so apparent in the majority of cases as to make a deep impression on either the patient or his relatives, who in favourable cases are so much impressed by his greater tractability that faults are minimized or overlooked. It was impossible to give a clear-cut account of what happened after leucotomy, owing to the fact that each patient was an "individual," behaving according to his own personality and his own environmental and genetic history, but observations on a series of 70 cases had shown that those patients did best who, before they became mentally deranged to a point requiring active treatment, had had time to acquire distinct personalities. Thus, patients suffering from depressive states, and those developing delusions or paranoia late in life, would be more likely to improve after leucotomy than the schizophrenics. One tiresome sequel to leucotomy (commonly

presented in pure frontal lesions) was incontinence during consciousness; this might persist for six months or more.

Dr. E. STENGEL (Chichester) suggested that prefrontal leucotomy would be of only historical interest in years to come when more refined techniques were available. Its effects in terms of physiology or psychology could not be defined but only in terms of personality change. The effects were reduction of spontaneity, lowering of emotional tensions and less ability to maintain emotional tensions, decrease of social responsibility, and a general lowering of the level of behaviour. Sometimes restlessness was produced. Leucotomy acted in two ways—by causing changes in certain mechanisms involving the prefrontal lobes, and as a powerful shock treatment. Good effects were produced in chronic depressive states. The chronic stress of schizophrenia could be turned to contentment, without however enabling the patient to be discharged. Changes of personality were dependent not so much on the extent or site of the lesion as on the patient's previous personality.

Dr. W. MAYER-GROSS (Dumfries) maintained that prefrontal leucotomy not merely balanced but extinguished psychotic symptoms, and the problem for the future was to produce as much reduction of psychotic symptoms as possible with the minimum of prefrontal lobe deficiency. He described one patient who had recurrent attacks of catatonia, which were temporarily stopped by insulin, shortened by shock therapy (which also increased their frequency), and permanently (so far) removed by leucotomy.

Dr. A. A. W. PETRIE (London) gave a preliminary report on the results of the psychological investigation of patients following prefrontal leucotomy. Tests were given prior to operation and two and six months post-operatively, and in a preliminary analysis at the first retest after leucotomy changes were noted in tests of persistence, muscular control, self-blame, speed, and suggestibility.

Dr. A. MEYER (London) described the results of examining 97 brains of leucotomized patients who had died, and discussed the effects of the operation according to the relation of the cut to the fibres connecting with the thalamus and hypothalamus. He concluded that patients who do badly and die soon after operation usually have an unduly posterior cut. The degree of personality change seemed to be associated with the number of fibres cut. The less desirable changes appeared with unduly posterior cuts. Cutting the central orbital fibres was of importance in producing an effective result.

Dr. M. A. PARTRIDGE (London), describing the effects of leucotomy, said that in the early weeks urgency and frequency of micturition or dribbling of urine were often noted. The early picture was of increased fatiguability and reduced activity, but patients could be energetic when interested. With time normal activity returned more than did normal restraint. Patients were thus less keyed up, more placid, and less restrained. They developed a "selective carelessness," not doing things they were not keen to do, and avoiding effort and discomfort. Hypochondriacal symptoms disappeared. The effects of leucotomy were dependent on the previous personality.

Dr. K. GOLDSTEIN (New York) said that in measuring the performance of patients who had had prefrontal leucotomy psychologists must not rely on the total scores for tests, but should study the way in which these were achieved. Many patients succeeded in more difficult but failed in easier tests. The key to the intellectual changes following leucotomy lay in the loss of the power of abstraction. Concrete performance was not so much impaired. Good social adjustment was due not so much to increased social co-operation as to reduced self-criticism. Such patients seemed restricted in personality and abnormally dependent on the outside world, and there was a need to reconstruct the patient's life. The question was whether an operation of this kind was justified when it deprived the patient of his essential nature.

### Problems of Ageing

Dr. A. T. WELFORD (Cambridge) surveyed the work of the Nuffield Foundation research unit established at Cambridge in 1946 under the direction of Sir Frederic Bartlett. From a preliminary interpretation of the findings of investigations into differences of skilled performance associated with different age groups it appeared that the principal locus of change lay within the central mechanisms. On the receptor side there was an increasing difficulty among older subjects to comprehend or organize a visual field or set of presented data. On the effector side there were differences of method of building or organizing a response. These changes of method appeared to compensate fairly effectively for deficiencies in many cases, so that measurements of total achievement did not give at all an adequate picture of the changes of performance.

In addition to the very full daily programmes, special evening lectures were delivered by Dr. H. S. LANGFELD (Princeton) on "American Psychology To-day," by Dr. A. MICHOTTE (Louvain), and by SIR FREDERIC BARTLETT (Cambridge) on the "Challenge to Experimental Psychology."

## CENTRAL HEALTH SERVICES COUNCIL

As we stated last week, the Minister of Health, Mr. Aneurin Bevan, has announced the members of the Central Health Services Council, of which we give a list below. One appointment has still to be made. Mr. Fred Messer, M.P., has been elected chairman, and Professor Henry Cohen vice-chairman. The secretary is Mr. E. J. S. Clarke, of the Ministry of Health.

*Ex-officio.*—Lord Moran, President of the Royal College of Physicians of London. Lord Webb-Johnson, President of the Royal College of Surgeons of England. Sir William Gilliatt, President of the Royal College of Obstetricians and Gynaecologists. Dr. Harry Guy Dain, Chairman of Council of the British Medical Association. Sir Herbert Lightfoot Eason, President of the General Medical Council. Dr. George Frederick Buchan, Chairman of the Council of the Society of Medical Officers of Health.

*Medical Practitioners.*—Dr. Janet Aitken, physician (London). Professor William George Barnard, pathologist (London). Mr. Aleck W. Bourne, obstetrician and gynaecologist (London). Dr. James Alexander Brown, general practitioner; member of Birmingham Regional Hospital Board (Birmingham). Sir Ernest Rock Carling, surgeon (London). Professor Henry Cohen, physician; member of Liverpool Regional Hospital Board and Board of Governors (Liverpool). Dr. Edward Andrew Gregg, general practitioner; member of County of London Executive Council (London). Dr. Wilfred Vivian Howells, general practitioner; member of Swansea Executive Council (Swansea). Dr. Horace Joules, physician and medical director; member of N.W. Metropolitan Regional Hospital Board and of Hammersmith, etc., Board of Governors (Middlesex). Professor Aubrey Julian Lewis, psychiatrist; member of Bethlem and Maudsley Hospital Board of Governors (London). Dr. William Gordon Masefield, psychiatrist; member of S.E. Metropolitan Regional Hospital Board and of Bethlem and Maudsley Board of Governors (Sussex). Dr. William Norman Pickles, general practitioner; member of Yorkshire North Riding Executive Council (Aysgarth, N. Yorkshire). Professor Sir Harry Platt, orthopaedic surgeon; member of Manchester Regional Hospital Board and Board of Governors (Manchester). Professor James Calvert Spence, paediatrician; member of Newcastle Board of Governors (Newcastle-upon-Tyne). Dr. Clement Willoughby Walker, general practitioner; member of Cambridge Executive Council (Cambridge).

*Persons with Experience in Hospital Management.*—Mr. Frank John Cable, superintendent, Manchester Royal Infirmary (Manchester). Mr. Sydney Clayton Fryers, house governor and secretary, General Infirmary at Leeds; member of Leeds Regional Hospital Board (Leeds). Hon. Arthur Jared Palmer Howard, Chairman of St. Thomas's Hospital Board of Governors (London). Sir Owen Frederick Morshead, member of N.W. Metropolitan Regional Hospital Board (Windsor). Major-General Sir Harold Augustus Wernher, Honorary Secretary of King Edward VII Hospital Fund and Chairman of University College Hospital Board of Governors (London).

*Persons with Experience in Local Government.*—Alderman Albert Frederick Bradbeer, member of Birmingham Regional Hospital Board, Board of Governors, City Council, and Executive Council (Birmingham). Sir Wynne Cemlyn-Jones, member of Anglesey County Council and Executive Council (Anglesey). Mr. F. Messer, chairman of N.W. Metropolitan Regional Hospital Board and Middlesex County Council; member of Middlesex Hospital Board of Governors and Middlesex Executive Council (Middlesex). Mrs. Dorothy Thurtle, member of London County Council and Shoreditch Borough Council (London). Alderman William E. Yorke, Lord Mayor of Sheffield; member of Sheffield Regional Hospital Board (Sheffield).

*Dental Practitioners.*—Mr. Frederick J. Ballard, member of N.W. Metropolitan Regional Hospital Board, University College Hospital Board of Governors, and Eastman Dental Clinic Board of Governors

(London). Mr. J. Lauer, member of Dental Estimates Board (London). Dr. Harry Thomas Roper-Hall (Birmingham).

*Persons with Experience in Mental Health Services.*—Sir Cecil Oakes, member of East Anglian Regional Hospital Board (Suffolk).

*Registered Nurses.*—Miss Eleanor Jeannette Merry, education officer, Queen's Institute (London). Miss Mary Elizabeth Gordon Milne, matron, St. Mary's Hospital (London).

*Certified Midwife.*—Miss Nora Bryan Deane, matron, Bristol Maternity Hospital (Bristol).

*Registered Pharmacists.*—Mr. Richard Henry Henriksen, chief pharmacist, Dulwich Hospital (London). Alderman William John Tristram, member of Liverpool City Council and Executive Council (Liverpool).

## INTERNATIONAL CONGRESS ON INDUSTRIAL MEDICINE

### PROGRAMME OF LONDON MEETING

The ninth International Congress of Industrial Medicine will be held in London from Sept. 13–17, and a preliminary programme has been issued. The opening of the congress will take place in the Central Hall, Prince's Street, Westminster, on Sept. 13, at 11.30 a.m., when the chairman will be Lord Moran, and the Rt. Hon. G. A. Isaacs, M.P., Minister of Labour and National Service, will give the inaugural address. The chairman at the closing of the congress on Sept. 17 will be Lord Webb-Johnson, and an address will be given by the Rt. Hon. G. R. Strauss, M.P., Minister of Supply. Further information about the congress can be obtained from the organizing secretary, Room 501, B.M.A. House, Tavistock Square, London, W.C.1. The meetings will be either in the Caxton Hall, Caxton Street, Victoria, S.W., or the Alliance Hall, Palmer Street, Westminster, as shown in the summary of the programme given below.

*Monday, Sept. 13, 2.30 p.m.*, at Caxton Hall, Studies in Atmospheric Pollution, Industrial Nursing, Organization of Industrial Medical Services, Industrial Medical Content of the Law; at Alliance Hall, Diseases of the Lungs other than Pneumoconiosis.

*Tuesday, Sept. 14, 10 a.m.*, at Caxton Hall, Work and Skill, Environment—Lighting, Aetiology and Treatment of Surgical Conditions found in Industry, Training of the Industrial Medical Officer; at Alliance Hall, Industrial Nursing. 2.30 p.m., at Caxton Hall, Environment—Architecture, Aetiology and Treatment of Surgical Conditions found in Industry, Radiant Energy—Hazards and Prevention, Toxicology; at Alliance Hall, Hazards and Aspects of Specific Industries.

*Wednesday, Sept. 15, 10 a.m.*, at Caxton Hall, Medical Supervision in Industry, Pneumoconiosis (1), Ophthalmology, Toxicology; at Alliance Hall, Organization of Industrial Medical Services. 2.30 p.m., at Caxton Hall, Environment—Thermal Comfort, The Newer Metals, Organization of the Industrial Medical Service, Pneumoconiosis (2).

*Thursday, Sept. 16, 10 a.m.*, at Caxton Hall, Integration of Occupational Health with National and Community Services, Dermatology, Preventive Methods in Mining, Aetiology and Treatment of Surgical Conditions found in Industry; at Alliance Hall, Environment—Applied Physiology. 2.30 p.m., at Caxton Hall, Occupational Tumours of the Bladder, Pneumoconiosis (3), Hazards and Aspects of Specific Industries, Industrial Electricity.

*Friday, Sept. 17, 10 a.m.*, at Caxton Hall, Incentives, Job Adjustment and Absenteeism, Pneumoconiosis (4), Hazards and Aspects of Specific Industries, Symposium on Colour Vision; at Alliance Hall, Toxicology.

The Mackenzie Industrial Health Lecture on "The Surgeon in Industry" will be delivered by Mr. H. E. Griffiths at B.M.A. House, Tavistock Square, London, W.C., on *Friday, Sept. 17, at 5.15 p.m.*

The programme also includes a list of places of technical interest to which visits will be paid during the week of the congress and the following week. Those wishing to be included in any of these visits should obtain Form I.C./6 from the secretary of Section V of the congress at the address of the organizing secretary.

## ORGANIZATION OF CONSULTANTS

### FORMATION OF JOINT COMMITTEE

A conference of representatives of the Royal Colleges, two of the Royal Scottish Corporations, and the British Medical Association was held at the Royal College of Surgeons on Wednesday, July 28, to discuss the general question of the organization to represent consultants in the future. Sir Lionel Whitby, President of the B.M.A., presided. After discussion it was decided to submit to the bodies invited to the Conference the following propositions:

(i) That a Joint Committee of the Royal Colleges, the Royal Scottish Corporations and the British Medical Association be established to advise the Minister of Health on all matters concerning consultants and specialists.

(ii) That the existing Committee of the Colleges and Corporations and the Central Consultants and Specialists Committee established by the British Medical Association continue in existence to brief the Joint Committee.

(iii) That the Joint Committee be requested to allocate, as soon as practicable, fields in which their constituent bodies are free to take independent action and to deal with Governmental bodies direct.

It was agreed to establish an Exploratory Committee of nine members with Sir Lionel Whitby as Chairman.

[The above is the subject of a leading article at page 343.]

## BEIT MEMORIAL FELLOWSHIPS FOR MEDICAL RESEARCH

The following elections for 1948–9 are announced:

*Senior Fellowship* (£900 *a year*): F. Sanger, B.Sc., to study the structure of proteins, with special reference to insulin (at the Department of Biochemistry, University of Cambridge).

*Junior Fellowships* (*normal value* £600 *a year*): D. A. Darcy, B.Sc., to study the role of the lymphocyte and plasma cell in homograft breakdown (at the Department of Zoology and Comparative Anatomy, Oxford); R. M. C. Dawson, B.Sc., to study biochemical changes in the brain associated with different forms of functional activity (at the Biochemical Laboratories, Cardiff City Mental Hospital); F. N. Fastier, M.Sc., to study the nature of the musculotropic action of basic amidine derivatives (at the Department of Pharmacology, University of Oxford); L. J. Haynes, Ph.D., to study the synthesis of the coezyme cozymase (at University Chemical Laboratory, Cambridge); A. T. James, Ph.D., to study the relationship between structure and biological activity in naturally occurring substances (at the Lister Institute of Preventive Medicine, London); A. McCoubrey, B.Sc., to study analgesic and addictive tendencies from a chemical standpoint (at the Departments of Organic Chemistry and Pharmacology, University of Leeds); S. W. Stanbury, M.B., Ch.B., to study the effect of changes in nervous activity induced by narcosis and sleep on the renal circulation and blood pressure in normal and hypertensive individuals (at the Department of Medicine, University of Manchester); D. Verel, M.B., B.Ch., to study the postural hypotension which may follow prolonged rest in bed (at the Clinical Research Unit, Guy's Hospital, London).

Regulations issued by the Secretary of State for Scotland empower local authorities under the National Health Service to provide services which go beyond the ordinary measures of health care. These include the supply of layettes and clothing for babies and mothers, meals at day nurseries, cots, beds, and bedding for people needing them on health grounds, and invalid chairs or invalid carriages. Because authorities might sometimes hesitate to provide items of this kind to people able to pay for them, the Health Service (Scotland) Act empowers the Secretary of State to allow authorities to make charges in this connexion. These regulations—the National Health Service (Local Authority Charges) (Scotland) Regulations, 1948—specify the items for which charges may be made if particular authorities wish to do so. Even where an authority decides to charge it can make a reduction where a person is unable to pay the authority's standard charge. Charges under the regulations may be either for outright supply or for supply on loan. In the latter case, and where they supply on loan other items such as ordinary nursing appliances for which no charge is allowed, authorities can make it a condition that loss or damage due to carelessness shall be paid for by the person responsible.

# Preparations and Appliances

## THE CURATOR HEEL

Mr. KENNETH H. PRIDIE, Bristol, writes: In these days there is considerable delay in getting corrective alterations even of the simplest type done to shoes. It seemed to me that it was obvious that there must be a mass-produced heel which could be quickly applied to a shoe by any competent repairer. A new heel which embodies a simple corrective device for use in cases of unbalanced and pronated feet—the condition generally known as "valgus feet" (Fig. 1)—is now being made by Messrs.

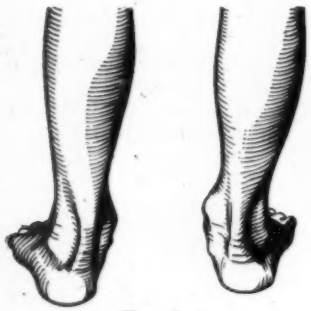


FIG. 1

FIG. 2

C. and J. Clark, Ltd., of Street. This heel, which is made of moulded rubber, has the advantage of a half-elongated heel with a one-eighth inch inside wedge (Fig. 2). The moulding has an improved support on the waist of the shoe which reinforces the upper so that it is not deformed by the pressure of a flat foot. The increased support has been found very effective in difficult cases, in fact a patient with a severe valgus deformity due to muscle imbalance was able to dispense with the outside irons and inside T-straps previously needed to maintain correction.

The advantage of this appliance is that if elongation and wedging of the heel is necessary the elasticity of the heel is unaltered, in fact it is improved. Most shoes in which the heel has been elongated and wedged become so rigid that the foot is splinted and the natural movements impeded. However, with this moulded rubber heel the foot is supported, "in-rolling" corrected, and excessive rigidity of the shoe avoided (Fig. 3).

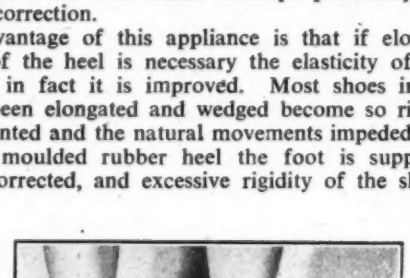


FIG. 3

After consultation with the surgeon or doctor, the parent should take the child to be correctly fitted by the nearest retailer stocking Clark's shoes in the full range of sizes and widths. These retailers are equipped with a special device for measuring the feet to ensure that a shoe is selected that gives the fullest amount of support combined with room for toes to grow. When the correct shoe has been selected the retailer will arrange immediately to have the normal leather heels removed and the "curator heel" fitted. The retailer will arrange this either in his own repair department or by sending the shoes to the factory to have the work carried out. In either case the time taken should only be a matter of days.

# Correspondence

## Diabetic Coma

SIR,—In the *Journal* of July 24 your wise editorial comment (p. 209) on the papers on diabetes appearing in the same issue will be welcomed by all those experienced in the treatment of the condition. It is doubtful, however, whether the very mild though telling criticism which it contained on certain of the views expressed in the respective papers of Dr. G. M. Wauchope (p. 191) and Professor R. H. Micks (p. 200) will be universally appreciated. Perhaps our experience, which is fairly extensive, may help to underline some of the observations made in your leading article and may also sound a warning note to those who may be tempted to follow implicitly the regimen suggested by your contributors.

We have given globin insulin a thorough trial since it was first introduced, and though we have found it a most useful preparation in many patients suffering from mild or moderate diabetes it has proved entirely unsuitable when used alone in a great many cases of greater severity. To suggest, as Dr. Wauchope does, that it is the insulin of choice in almost all ambulant cases of diabetes is an exaggeration which would only lead to the misuse of the preparation and to the consequent inadequate control of diabetes in a high proportion of patients. It seems to us essential for clinicians to be fully aware of the limitations of globin insulin if the incidence of complications is not to increase.

There is much in the article by Professor Micks on the treatment of diabetic coma which is valuable and worthy of the closest attention: the necessity of aspirating the stomach contents and of giving adequate amounts of saline solution rapidly by the parenteral route needed to be stressed. We find ourselves, however, quite unable to agree with the dosage of insulin which he recommends. We fully appreciate that for too long there has been a general tendency to use quite inadequate amounts of insulin in this emergency and undoubtedly many lives are lost on this account, but to go to the other extreme and to advocate such doses as 500 units initially, followed by 100 units as often as every ten minutes if improvement is not manifest within an hour, is in our opinion highly dangerous advice.

It is certainly true that an initial large dose is needed in order to overcome the resistance to insulin which is so marked a feature of diabetic coma. It is equally true that if the initial dose be inadequate insulin resistance will persist and may actually be increased. As was first pointed out by Joslin, insulin given within the first three hours is considerably more effective than a similar dose spread over a longer period. In the majority of cases, however, 100 units given initially followed by 100 units one hour and two hours later is sufficient to cause a rapid increase in sensitivity to insulin and to bring about a sharp fall in the blood-sugar level. When excessive loading doses are given, hypoglycaemia results, which in an unconscious, dehydrated patient is not always as easy to recognize as Dr. Micks would suggest. Using the doses suggested by him such hypoglycaemia is bound to be a common occurrence, especially in the hands of inexperienced physicians in circumstances which do not permit of careful blood-sugar control. While the author acknowledges that such cases may be expected he dismisses hypoglycaemia as a minor complication which is easily remedied. In doing so we believe him to be minimizing a very real danger, and that to precipitate a patient already severely shocked into hypoglycaemia may prove fatal in certain cases.

In our experience the insulin dosage recommended by Professor Micks as a routine procedure is seldom necessary and should never be used by those inexperienced in the treatment of diabetic coma. That he is able to advocate it with such confidence would seem to indicate that his patients are more insulin-resistant than most of ours. According to his previous papers the patients under his care are taught to control their diabetes by insulin alone, without much dietetic restriction. In our clinic the great majority of patients are treated not only by insulin but by fairly meticulous control of their carbohydrate and calorie intake. It is possible, though by no means certain, that

this difference in dietetic control may account for the altered insulin-sensitivity exhibited in coma by the two groups of patients.—We are, etc.,

D. M. DUNLOP.
J. B. DONALD.

Edinburgh.

SIR,—Professor R. H. Micks (July 24, p. 200) stated, "As far as I know there is no record of a patient ever having passed from diabetic coma into a fatal hypoglycaemic attack." The implication is that this does not happen, but such a conclusion is hazardous. I would suggest that hypoglycaemia in the energetic treatment of diabetic coma, without facilities for frequent blood-sugar estimations or utilization of such, or without the concomitant use of glucose, is common and is occasionally fatal. I have certainly met with it when emergency treatment, particularly over week-ends, was in the hands of relatively inexperienced hospital residents. Publications of such cases may be advisable, but too much significance should not be attached to their absence.

At a 1947 endocrine conference, when I spoke of the dangers of overdosage with desoxycortone, three doctors informed me of their experience of acute adrenal insufficiency being transferred into fatal hypopotassiumaemia, and expressed their appreciation that the danger had been aired. Existing publications hardly reflected such experiences. Hormones are indeed powerful agents, and overdosage no less a danger than timid inadequate therapy.—I am, etc.,

London, W.1. S. L. SIMPSON.

SIR,—The following case illustrates two points in Professor R. H. Micks's article (July 24, p. 200).

The patient, a girl of 21 years, was admitted to hospital with a 7 months' history of great lassitude and amenorrhoea; she had had a boil on her buttock for 10 days. Retrosternal oppression and increased laboured respiration had been present for 12 hours. Temperature was 101.5° F. (38.6° C.), pulse 144, respirations 28. Her face was flushed, mouth parched, tongue red and dry; there were no chest signs, the heart was normal, the abdomen resistant. The patient was not comatose, and diagnosis of hyperglycaemia was only made after the urine had been examined and was found to be loaded with albumin, sugar, and acetone. Further questioning disclosed thirst and polyuria for seven months, blurring of vision for some weeks, and pruritus vulvae for two days. Blood sugar was 400 mg. per 100 ml., and the B.S.R. was 62.

The orthodox treatment of insulin and glucose was commenced with 50 units of soluble insulin and 50 g. of glucose by mouth at 9 a.m. and repeated at half these doses two-hourly. The patient grew worse throughout the day, vomited 18 oz. of dark-coloured fluid at 9.30 p.m., and became comatose. An intravenous dextrose saline was then given. Her rapidly worsening condition gave rise to anxiety, and the dose of insulin and glucose was stepped up to 25 units and 20 g. hourly, and then half-hourly, until a total of 750 units of insulin had been given. Meanwhile catheter specimens of urine were examined with each dose for fear of hypoglycaemia. The large doses of insulin were administered as a desperate and final measure and were considered a gamble.

With a total of 750 units by 7 a.m. the following morning the patient showed marked improvement. Blood sugar had fallen to 85 mg. per 100 ml., though the urine still showed sugar +++ (3%). Three days later she had a fasting blood sugar of 296 mg. per 100 ml., which rose to 405 mg. one hour after glucose and was 367 mg. after 4 hours. Sugar +++ and acetone ++ were found in each specimen of urine during sugar-tolerance test. Further progress was uneventful.

This case is of interest as demonstrating Professor Micks's points of the dangers of too conservative an administration of insulin and of gastric dilatation. Large insulin dosage at an early stage would have been safer. Glucose was given both by mouth and intravenously in liberal amounts in accordance with current usage. The withholding of glucose in diabetic coma is a modern departure and an interesting one.—I am, etc.,

Stirchley, Birmingham. ROBERT J. D. BROWNE.

SIR,—To me it appears that Professor R. H. Micks (July 24, p. 200) implies that injection of insulin into the tissues of an "inaccessible" diabetic patient is devoid of danger. What else can he mean by advocating that "the doctor called to a case of coma should always give at least 100 units before even ordering the ambulance"? Perhaps the context makes it sufficiently clear that his advice to general practitioners supposes competence to differentiate between diabetic coma and insulin reaction. Without presuming to give an opinion on the reasonableness of this supposition, I venture to record the impression gained as a hospital resident that many doctors are unwilling to attempt clinical diagnosis of the unconscious diabetic patient, and to suggest that the advice quoted above is not devoid of danger.

I have in mind an instance which may be without parallel but not without moral. A doctor summoned to the patient of a colleague (who was away) found a diabetic man unconscious. The doctor gave insulin and reassurance. Some four hours later the doctor prescribed more insulin and a hot-water bottle. Four hours after that the patient arrived in hospital, where consciousness was shortly restored with intravenous glucose. The patient recovered from his hot-water bottle burns in a fortnight, and from the empyema which complicated his pneumonia in a further six months. When the doctor who had prescribed the insulin was told the history of the case, the only comment was, "At least my insulin did him no harm."

May I submit that Professor Micks's counsel to the general practitioner should be reworded: "The doctor called to a case of coma should always order the ambulance before giving any insulin"?—I am, etc.,

Droitwich Spa. BRIAN WEBBER.

## Pain in Phantom Limbs

SIR,—In their letter (July 31, p. 267) Dr. R. E. M. Bowden and Dr. J. R. Napier put forward a point of view that I think should not be allowed to pass unchallenged. They state that cases of phantom limb pain should be divided into two separate and distinct types according to whether pain is (1) burning in character or (2) stabbing, shooting, or tingling. (They do not mention that in addition to these various degrees of cutaneous pain patients with phantom pain also experience deep muscle and joint pain.) Their view is, I realize, a commonly held one, but several reasons can be given for disagreeing with it.

1. *Experimental Observations.*—Among the many interesting observations on pain sensation made by Sir Thomas Lewis and still not sufficiently well known, one was that exactly the same type of cutaneous stimulus could produce either burning pain or a stabbing, pricking sensation, the result depending entirely on the intensity and duration of the stimulus. A brief stimulus gives rise to "pricking" pain, a more prolonged stimulus to "burning" pain; and this is always so in whatever way cutaneous pain is provoked. In other words, the difference between burning pain and a stabbing, pricking, or tingling sensation is merely a difference in intensity and does not necessarily involve any difference in the nature of the causative lesion.

2. *Clinical Features.*—In addition to patients who have constant burning pain in a phantom limb and those who have constant stabbing, pricking, or tingling sensation, there are many who, while they usually have a pricking or tingling sensation, experience burning pain during periods of exacerbation of pain such as commonly occur in these cases. There are also patients who generally do not suffer from any type of phantom pain but at intervals have attacks of pricking pain or of burning pain. And in many patients who have severe burning pain for some weeks or months after amputation the severity of the pain gradually lessens, so that later they have a stabbing, pricking type of pain, and later again experience even this type of pain only at intervals. It seems impossible to regard these different types of phantom pain as indicating different conditions, for that would imply that one condition could change for a period into another. The more reasonable view would seem to be that the nature of the condition remains the same, the only change being variation in intensity of pain. Moreover, tender neuromata may be present in patients with burning pain as well as in patients with less severe pain, and in both groups pressure on tender neuromata causes exacerbation of pain. Such associated features as cutaneous tenderness, cyanosis, and hyperidrosis are as a rule prominent only in severe examples of the condition, with burning cutaneous pain and usually also severe muscle and joint pain.

3. *Response to Sympathectomy.*—Dr. Bowden and Dr. Napier state that patients with the less severe type of pain are unlikely to respond to sympathectomy. I carried out sympathetic procaine blocks in several patients of this group and found that in them, just as in patients with severe burning pain, this produced immediate relief in some and not in others. Subsequent operative sympathectomy was, however, practically never carried out in patients without burning pain, as in these patients the phantom sensation was seldom unpleasant enough to make them anxious to undergo a major operation for its relief.

For these reasons, then, I regard all cases of phantom pain as being similar in origin and mechanism of production, whether they have burning pain or not. It is, however, possibly not altogether desirable for the word "causalgia" to be used to describe all these cases, with their varying painful sensations, or even for the term "minor causalgia" to be used for the less severe examples. As pointed out by Dr. Bowden and Dr. Napier, Weir Mitchell originally coined the word "causalgia," meaning literally "fire pain," to describe only the single symptom of burning pain; and it might still be desirable to use it only in this sense, or at least only for cases with this type of pain, without of course implying that there is any difference in pathogenesis between this "causalgic" pain and lesser degrees of pain following nerve trauma.—I am, etc.,

Belfast. J. A. W. BINGHAM.

## Fibroma of the Labium Majus Complicating Pregnancy

SIR,—It must be very rare for tumours of the vulva to reach such a size during pregnancy that they constitute a possible difficulty in labour. The following report describes the occurrence of such a tumour.

CASE REPORT

A Muganda woman came to the hospital in October, 1947, to await her confinement. She had had two previous normal deliveries and was then about eight months' pregnant. It was a vertex presentation, and there was no disproportion. From the vulva hung an elephantoid mass the size of which can be gauged from the accompanying photograph. This mass had first appeared in January, 1947, and the patient must have become pregnant very shortly afterwards. As the tumour was likely to cause obstruction to delivery it was decided to perform caesarean section at term, and then remove the mass later. Accordingly on Nov. 19, 1947, when labour had just begun, a classical caesarean section was carried out.

Three weeks later, on Dec. 12, 1947, the tumour was removed. It was found to be arising from the right labium majus, with a broad pedicle extending up to the right of the symphysis pubis. The mass weighed approximately 5¼ lb. (2.4 kg.). Recovery was uneventful, but the patient insisted on leaving hospital before the perineal wound had completely healed.

Dr. R. B. Baird, of the Medical Laboratory, Kampala, reported on the tumour as follows: "Consists of a mass of fibro-fatty tissue in which there are fairly numerous dilated lymph vessels. I can find no evidence of lymphogranuloma or of filariasis, but cannot definitely exclude the latter. Probably a fibroma."

My thanks are due to Dr. R. B. Baird for his pathological report, and to Dr. Hebe Welbourn for the photograph.

—I am, etc.,

Kampala, Uganda. W. R. BILLINGTON.

## Acute Intussusception in Childhood

SIR,—The interesting and thorough paper by Drs. Brenda Morrison and Donald Court (April 24, p. 776) brought to my mind an experimental and clinical study on the subject made by my former chief, Dr. W. Obadalek, which appeared in 1929 in *Brun's Beiträge zur klinischen Chirurgie* (**146**, 668). Its clinical part is based on 53 cases of intussusceptions in infants and children ranging in age from 3 months to 13 years, 28 of them under 2 years old. They were treated in the surgical wards of the Children's Hospital in Brno (Czechoslovakia) between 1910 and 1928. Since 1921 the number of infants among the material increased steadily, apparently because the condition was more frequently diagnosed by the general practitioner.

Obadalek's diagnostic observations concur with those of Morrison and Court and so do the results of treatment, which in 50 cases was surgical. A diagnostic "pointer" which Obadalek stresses is dullness on lumbar percussion of the supine patient which disappears after he has been turned on the opposite flank, thus indicating free fluid in the abdominal cavity. He found it in all cases of his material, and its great value in his opinion lies in the fact that it helps to differentiate non-surgical diseases—e.g., dysentery, purpura, constipation, alimentary intoxication—from abdominal conditions requiring surgical attention. In doubtful cases a diagnostic enema (without *x* ray) often produced blood where none had been observed before.

The high proportion of intussusceptions in childhood—53 out of a series of 101 cases of ileus treated altogether in that period—Obadalek explains by (1) stronger intestinal peristalsis and more irritable intestinal mucosa in children; (2) the unequal growth of ileum and colon, resulting in a difference in diameter between ileum and colon, which is most marked in infants of 4–6 months; and (3) a mobile caecum frequently found in infancy and early childhood. The intussusception, he believes, is initiated by a localized intestinal spasm. In 15 out of his 50 operated cases congenital or inflammatory changes were found in the intestine concerned, or in its vicinity: 4 polypi, 3 Meckel's diverticula, 1 tuberculous ulcer, and 7 cases of inflammation of the appendix ranging from chronic disease involving the regional lymphatics to gangrene.—I am, etc.,

Derna, Cyrenaica. F. BARBER.

## Filariasis

SIR,—The initial clinical manifestation of Loa loa may only appear several years after infestation with the parasite, and infected individuals may not develop symptoms until after taking up residence in this country. Furthermore, as these symptoms are thought to be due to an allergic reaction to toxic products of the worm resulting in urticarial eruptions and painless swellings in the subcutaneous tissues, either localized (Calabar swellings) or diffuse, the condition may be diagnosed as angioneurotic oedema, and the underlying cause passed unrecognized. The following case report may be of interest.

A male, aged 26, was referred to hospital on April 7, 1948, because of a painless swelling of the left arm of 5 days' duration, and itching of the left shoulder. There was no history of relevant illness in childhood or adolescence, and the family history showed no proneness to allergic disorders. He had served in Southern Nigeria from 1943 to 1946, with only a few months' interval in 1944, and had had eight attacks of malaria. Repatriated in November, 1946, he had been fit and had worked up to the present illness.

On general examination he was well nourished; all the internal organs were normal. Slight conjunctival injection and palpebral swelling in the left eye was noticed. There was uniform swelling with no tenderness and with only slight pitting on pressure of the left axilla, arm, forearm, and hand. A mild papular eruption could be felt over the pruriginous area. There were no nodules. He was recommended to take "anthisan," 200 mg. 3 times a day, and to report in one week's time. The swelling did not subside with this treatment, and he was therefore admitted on April 15.

The history of prolonged residence in Southern Nigeria led us to suspect African filariasis, more commonly known as Loa loa, but no microfilariae were seen in the blood films taken on numerous occasions over a period of several days. A concentration test was also negative. Blood counts, however, showed on repeated occasions a high total leucocyte count, 21,000–32,000, with a marked eosinophilia of 51.5%–65%. The laboratory of the London School of Hygiene and Tropical Medicine kindly performed a complement fixation test with dirofilarial extract, and this was found to be positive.

The swelling slowly subsided and had practically disappeared by April 24, there remaining only a palpable gland in the left axilla. The patient was discharged on April 26. On April 30 the painless, diffuse swelling reappeared in the left supraclavicular region and shoulder. It disappeared on May 4. The patient was later transferred to another hospital for chemotherapy.

The diagnosis of Loa loa was based in this case upon the following significant points: (1) the occurrence of angioneurotic symptoms in an individual who had returned from a filarial region in West Africa; (2) the finding of leucocytosis with very high eosinophilia; and (3) the finding of a positive complement fixation reaction with dirofilarial extract. A skin test with the extract, often positive in the disease, was not carried out in this patient, under the mistaken impression that it might not be

advisable in the presence of acute allergic manifestations. Failure to find microfilariae in the blood does not exclude the diagnosis, as they may be very difficult to demonstrate in Loa loa. An annotation in the *Journal* (July 3, p. 32) has recently drawn attention to the possibility of the successful treatment of filariasis by chemotherapy.—We are, etc.,

G. MELTON.
E. MONTUSCHI.

London, N.21.

### Compensation for Industrial Injuries

SIR,—I would like to draw attention to a point in the National Insurance (Industrial Injuries) Act which will cause much dissatisfaction among employees. A man is adjudged to be recovered from a disability when he is able to enjoy the normal amenities of life and to return to work. It does not state that he is able to return to his *original* work. Thus a skilled worker, say for instance a french polisher, would not be entitled to any disability pension once his dermatitis has disappeared, even though he could never return to his highly paid job, because he is now fit to undertake labouring work. I believe there may be some small payment up to one pound in special cases, but nothing comparable with that under the Workmen's Compensation Act.

The only method open to the workman is to bring an action against the employer based on negligence, a very unsatisfactory and hazardous procedure. Even under the old Act the employee is often very dissatisfied, and one feels that he will be much more so unless some new arrangements can be introduced.—I am, etc.,

F. F. HELLIER.

Leeds.

### Standardization of Stretchers

SIR,—I was much interested in the article by Lieutenant-Colonel R. T. Wells (June 26, p. 1246) on this subject, and I heartily agree that steps should be taken to standardize both the stretchers and the tracks in the ambulances themselves. As one who has taken an interest in ambulance work for over thirty-five years and who has had considerable experience with the fitting and maintenance of ambulances in peacetime and during the late war in civil defence, I feel, like your correspondent, that a common policy should be adopted, especially just now when the various health authorities under the Health Act, either directly, or, as in some counties, through their agents the St. John Ambulance Brigade and the British Red Cross Society, are acquiring new vehicles.

I feel, too, that not enough use is made of the telescopic-handle type of stretcher, so useful not only in hospital lifts but also on awkward stairways where a carrying sheet is not practicable, but this should not lead to ambulances being built with a shorter inside body measurement than 7 ft. 10 in., otherwise interchangeability may be impracticable.

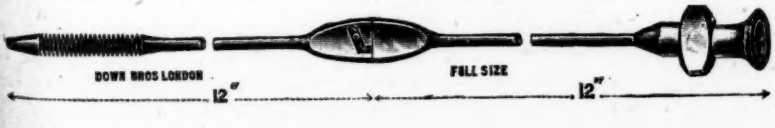
My view also is that the tracks for the stretchers to run in should be of the following type : on the side nearest the body of the vehicle, both near and off, ⊔-shaped, and that on the inner side near the gangway should be simply ⌊-shaped. The vertical arm in each case should be towards the other track, unless of course the ⊔-shaped tracks are made wide enough to allow for the difference of the width in the runners themselves or the actual width of the stretcher, so also giving a margin for the possible splaying of the stretcher in wear.—I am, etc.,

HUGH POWELL.

Weston-super-Mare.

### Needles for Varicose Veins

SIR,—The needles here illustrated have been used by me continuously since October, 1946. Their purpose is to abrade the interior of the internal or external saphenous vein at the operation of ligature of varicose veins. The larger extending needle is passed down the saphena magna from the groin and will occasionally travel to its full length—i.e., to well below the knee. The skin is pressed down over the rough end of the needle with the fingers and by short up-and-down movements the venous endothelium is mechanically scarified, thus ensuring rapid thrombosis, which will be followed by resolution and permanent obliteration of the internal saphenous trunk where it has been so treated. The smaller needle is inserted at the internal malleolus and usually passes up to the knee. This section is similarly lacerated internally.




These needles fit a Record syringe so that sclerosing fluids can also be introduced. Both sections of the extending needle are made to fit a Record syringe. The roughened ends have been arrived at by repeated experiments with Messrs. Down Bros., to whom I am indebted for their courtesy and assistance. I was introduced to this endothelial destruction by Dr. Field, who had seen it used by Mr. Riddoch, of Birmingham, who kindly presented me with his needle. By their use only a small volume of sclerosing fluid is required and permanent destruction of the internal or external saphenous veins is certain.—I am, etc.,

HAROLD DODD.

London, W.1.

### Twin Pregnancy and Hydramnios

SIR,—We should be grateful to Dr. R. W. Danziger (July 24, p. 205) for his note on twin pregnancy with acute hydramnios, for, as Browne points out, acute hydramnios is very rare. How rare I do not know, but in this hospital, where we see 1,400 deliveries annually, I have seen only one such case in five years. This would explain why textbooks of obstetrics hardly mention the treatment of puncture of the uterus.

Dr. Danziger says that there is no objection to repeating the process. I would go further than this and say that the puncture of the uterus should be repeated again and again provided it can be shown by the tape measure that the girth of the abdomen is constantly increasing. If it is not repeatedly aspirated, then there is a very great danger that the membranes may rupture spontaneously and the woman may die of the shock produced by the sudden liberation of gallons of fluid, to which may be added a post-partum haemorrhage.

The late Mr. Carnac Rivett's observation that the fluid is not under pressure is not borne out by my experience either. It is under great pressure and will continue to pour out of the cannula for as long as required. In my case first 7 and then 8 pints were aspirated.—I am, etc.,

KEITH VARTAN.

British Hospital for Mothers and Babies, London, S.E.18.

### Control of Treatment

SIR,—The recent controversy upon the importation of B.C.G. for use in this country either by those who are convinced of its value, or alternatively for use only by some who would conduct a controlled five- to ten-year trial, raises a point of great pertinence.

B.C.G. has been used over many years and detailed results have been published by men of high repute in many countries. On the basis of these reports many in this country have already concluded in its favour. They would say that the proposed trial would be an unjustifiable deprivation to many who would otherwise receive B.C.G. and a restrictive control applied in the field of preventive medicine. The other group finds reason to doubt the validity of the published statistics and wishes trials to be repeated on lines more acceptable to our statisticians. A compromise might be reached by providing clinical material through certain institutions for a long-term trial and at the same time allowing physicians of standing in the tuberculosis field to use B.C.G. as they thought fit. By either of the last two schemes a black market would probably be created.

Be that as it may, and admitting the existence of two opinions on the subject, there is still an even more basic principle involved. The Ministry of Health would appear at present to be considering restriction of the use of a new treatment, in this case prophylactic, by means of restriction of import. This raises the question as to whether new drugs and treatments should be tried out by whoever wishes, or in some cases be at first restricted to special research trials. This is a matter which is of great importance to clinical medicine and of no concern in the first instance to administrators. It should therefore be settled by a body representing the profession and not by a Ministry. Indeed the administrative mind is likely to introduce cross currents into a discussion which ought to lead

to a decision based solely upon scientific considerations. When that basic decision has been taken, then we are still faced with the question as to whether this or that new drug should be the subject of restricted trial or not. Again I say that only a purely professional body should take these decisions and not the Ministry of Health. It is a short step from restriction of import from abroad by the Ministry to control of the distribution of home-produced drugs.

The Ministry can in this instance apply control because we do not produce B.C.G. ourselves, but it would be wrong to allow this particular case to develop further without realizing what is involved : control in the clinical field by the Ministry, advised by professional men of its own choice, or control of such therapeutic trials by a wholly professional body for whose decisions the Minister and his administrative department do not have to be responsible.—I am, etc.,

Stanmore, Middlesex. HARWOOD STEVENSON.

## Use of Ring Pessaries

SIR,—The provocative condemnation of the ring pessary by Mr. Mortimer Reddington (July 24, p. 227) was doubtless intended to stimulate interest and discussion about this admirable appliance, and I need no further apology for my remarks, dogmatic though they be.

The "stink and dangers" of pessary treatment may be entirely eliminated if no ring is fitted which cannot easily be withdrawn, and if rubber instruments are abandoned. The only indication for the watch-spring pessary is in the treatment of occasional cases of incarcerated retroverted gravid uterus, when it may be used for a short period of time. A light vulcanite or plastic ring may be used with advantage in those cases of puerperal prolapse in which exercises and physiotherapy fail to prevent descent of cystocele or cervix outside the vulva ; decreasing sizes of ring may be fitted at short intervals to ensure that support is effected by pressure on the levatores ani without interference with the involution of the vaginal fascia. Similarly an early menopausal prolapse may sometimes be controlled so well with a ring for a few years that subsequent vaginal contraction may make further treatment unnecessary. The temporary value of the ring for patients awaiting operation, and for those who desire to postpone surgery for domestic or social reasons, is common knowledge ; while a not inconsiderable number of patients may express great satisfaction and decline operation.

There are uses too for pessaries other than the hard ring. An acquired post-partum retroversion may on occasion be responsible for symptoms, and it would appear rational to correct such malposition as a routine, fixing the uterus with a Hodge-type pessary until involution of the pelvic fascia has made such support unnecessary. This pessary may also be used as a diagnostic measure, to determine which symptoms in any given case of retroversion may be expected to be relieved by an operation for anteversion. Then there will always be a few cases of utero-vaginal prolapse in old women who are barely fit for operation, which may be well controlled by the Simpson shelf pessary. Finally, despite Mr. Mortimer Reddington's gloomy emphasis, it may be possible greatly to relieve stress incontinence of micturition by fitting a Hodge pessary turned upside down and back to front, as demonstrated by Professor Chassar Moir.—I am, etc.,

Birmingham. W. G. MILLS.

## Osmoreceptors

SIR,—Professor E. B. Verney (July 17, p. 119) infers from his findings that "osmoreceptors" exist in the brain, and suggests experimentation on their precise localization and histological identification. It is generally accepted that physiological and pathological swelling of the brain may be reduced by hypertonic saline or sucrose injections, and that the shrinkage is balanced by an influx of blood to the brain. The increase of cerebral blood flow under such conditions lessens synaptic resistance (*British Medical Journal*, 1938, **1**, 265), and therefore more neuronic stimuli per unit time reach the supraoptic nuclei to activate the posterior pituitary and give an antidiuresis.—I am, etc.,

Birmingham. F. A. PICKWORTH.

## Chemists' Working Hours

SIR,—I am obliged to Mr. H. W. Tomski (July 17, p. 177) for his assurances and the figures he adduces in support of his arguments, both all too familiar and fallacious. If few people took advantage of the experimental late opening it was because few people or doctors knew about it. Even now it is hard to find a chemist who exhibits in his window the rota list after closing hours, except in Paddington, where an excellent rota is carried on. It is for the doctors to bestir themselves in their own areas to ensure an efficient pharmaceutical service.

There can be no doubt that the public are suffering unnecessary hardship as a result of the 6 p.m. closing of chemists. The pharmacists must clarify their status. Either they are shopkeepers pure and simple or members of a profession with dignity and concomitant responsibility. If the latter, they should not shelter behind the Shop Hours Act, which in any case does not apply to dispensing. Let the rota be efficiently run and publicized, and the chemists will not need to complain that they are wasting their time by late opening.—I am, etc.,

London, W.2. M. MUNDY.

## Hearing-aids

SIR,—May I through your columns make the position clear regarding hearing-aid supplies ? We are, at our acoustic branches, receiving a considerable number of callers with E.C.10 prescriptions, some of which are specifying that the patient be supplied with a "National hearing-aid" ; others prescribe that the patient's existing hearing-aid shall be repaired under the health scheme, and still others call for supplies of hearing-aid batteries.

The Government has chosen to leave hearing-aid manufacturers such as ourselves outside the scheme, and therefore we are not in a position to accept prescriptions for any hearing-aid supplies other than those for which the patient is prepared to make payment. It seems unfair that existing users of hearing-aids are not to get assistance under this new comprehensive service towards maintaining their instruments, but it remains for the deafened public to make representation in the proper quarter if they wish to get this apparent anomaly rectified.—I am, etc.,

O. C. LEADBITTER,
Controller, Hearing-aid Division,
John Bell & Croyden.

Oxford.

# POINTS FROM LETTERS

### Treatment of Pneumonia

Dr. MALCOLM TATE (Mansfield, Notts) writes: The *Journal* of July 17 (p. 157) contains an interesting summary of the discussion on the treatment of pneumonia at the annual meeting of the B.M.A. There is no mention in it, however, of what many of us feel to be an important part of this treatment. We consider that all patients who have been successfully treated for pneumonia must have a final chest *x*-ray examination before we can say that they are cured. Only in this way can we discover any underlying pulmonary disease, such as bronchial carcinoma or atelectasis, and such sequelae as a small pleural effusion or incomplete resolution. We may by a timely *x* ray hope to increase the operability of bronchial carcinoma, which is so deplorably low at present. It is for this reason above all others that I advocate the accessibility of the *x*-ray departments to the general practitioner *now*, not when health centres are built.

### Analgesia in Midwifery

Dr. ALEX. WATT (Dalry, Ayrshire) writes: It was with much interest and some amusement that I read the proceedings at the combined meeting of the Sections of Anaesthetics and Obstetrics dealing with the position of analgesia in midwifery (*Journal*, July 17, p. 155). I consider it amusing that a specialist anaesthetist should be required to conduct analgesia. Such a qualification alone is insufficient for the purpose, but would require to be combined with a thorough knowledge of women in labour, and that of many hundreds of cases, and in general practice. It is not at all likely that all women will be admitted to hospital for confinement, therefore the conduct of labour and the exhibition of analgesics must necessarily fall on the general practitioner. . . . Analgesia can be perfectly satisfactory in every case provided the obstetrician or general practitioner has a knowledge of all the agents and can concoct a suitable cocktail for the individual case. . . .

# Obituary

## C. M. KENNEDY, M.B.E., F.R.C.S.

Mr. Charles Matheson Kennedy, who died at his home in North Bovey, Devon, on July 26, was one of the best known and respected of Plymouth surgeons. He was born at Moville, Co. Donegal, in 1884, and educated in England at Saint Edward's School, Oxford, and the London Hospital. He qualified in 1906, and held resident appointments at the London Hospital, at one time being house-surgeon to James Sherren, until obtaining the F.R.C.S. in 1911. He was then appointed a surgical registrar, a post he held until the outbreak of the 1914–18 war, when he at once joined the Army. Most of his service was spent in France, where he was employed as a surgical specialist. At the close of the war he was commanding the limb-fitting hospital at Roehampton with the rank of lieutenant-colonel. He was awarded the M.B.E. for his services.

After the war he settled in Plymouth, being appointed assistant surgeon to the hospitals now combined as the Prince of Wales's Hospital. He commanded for a time the Wessex Field Ambulance, T.A. In due course he became full honorary surgeon to his hospital and was elected to the staffs of a large number of associated cottage hospitals in the Plymouth and East Cornwall area. He was also orthopaedic surgeon to the Plymouth Orthopaedic Hospital under the Plymouth City Council, and to the Dame Hannah Rogers Children's Orthopaedic Hospital at Ivybridge. It can be judged from the number of these appointments that he was a very much employed man. He was an able and bold surgeon, his technical ability being reinforced by sound judgment in diagnosis and procedure. During the last war he did an immense amount of work among the air-raid casualties in Plymouth and travelled hundreds of miles, often in conditions of considerable danger.

Charles Kennedy's services to the B.M.A. were manifold and given without thought of his own affairs. He was a past president of the South Western Branch and past chairman of the Plymouth Division, in which capacity he served throughout the war. His advice was constantly sought and always valuable, accentuated by that particular brand of humour which made his points so emphatic. He was also a great Mason. He held the office of Senior Grand Warden of Devonshire, was a member of three Lodges, of two of which he was a Past Master and of one a Founder. He was in much demand as an after-dinner speaker and will long be remembered for his fluent and witty speeches, one of which was the highlight of the Annual Dinner of the Association in 1938. His untimely death at the age of 64 found him still in harness and full of interests outside his professional work. He was a talented gardener and a keen fisherman and shot. His loss will be felt widely; not only his professional colleagues but a host of friends deplore his passing, and a multitude of grateful patients will miss his cheery presence and his universal kindness. To his widow and four sons, two of whom follow in his footsteps, goes out the sincere sympathy of all who knew him.

## W. ARNOTT DICKSON, M.D., F.R.C.S.Ed.

Dr. William Arnott Dickson, for many years a well-known figure in the life of Gloucestershire, died at Thames Ditton, Surrey, after a short illness, on July 25. Though he had retired and had been living in Scotland since 1944, the announcement of his death has come as a shock to the many who enjoyed his friendship and relied on his wise counsel. Arnott Dickson graduated M.B., Ch.B. at St. Andrews University in 1904. The range of the higher qualifications with which he soon afterwards equipped himself is significant of the high standards he set for himself and of the breadth of his outlook on medicine. He obtained his F.R.C.S.Ed. in 1907, his M.D. in 1908, his D.P.H. in 1910, and his M.R.C.P.Ed. in 1923.

After gaining experience as a house-surgeon and practising in partnership with his brother, the late Dr. David Dickson, of Lochgelly, Fife, he became Tuberculosis Officer to the Fife County Council. In 1913 he settled in Gloucestershire as County Tuberculosis Officer, with which post there was combined, a few years later, that of Medical Superintendent of the Standish House Sanatorium. It was Arnott Dickson who organized and developed the whole county tuberculosis service from its small beginnings. His relationship with the Joint Board for Tuberculosis, which administered that service, was a very happy one; he enjoyed the confidence and esteem of the members in quite exceptional measure. Yet there was in him nothing of the public official. He was essentially a physician and one with whom the individual and his personal problems counted most. His colleagues throughout the county placed great reliance upon his opinion both as a consultant and as a friend. Throughout his career he also took a prominent part in medical affairs in the county. A member of the B.M.A. since 1905, he was honorary secretary of the Gloucestershire Branch from 1922–30, president of the Branch in 1930–1, and a Representative from 1937–43.

Arnott Dickson had a vigorous, efficient, and well-stored mind. He combined a genial disposition and a buoyant wit, which was never long concealed. With all his popularity he was entirely without self-seeking or affectation, and he found his greatest happiness in his home life, where he was ever the kindest of hosts. But it is also true of him to say that underneath his attractive social qualities there lay something in reserve, depths of feeling and of reverence from which he drew inspiration for his sane and healthy attitude to life.

On his retirement in 1944 he was presented with a silver bowl subscribed for by members of the profession in all parts of the area—a tribute to the respect and affection in which he was held. He is survived by his wife and two daughters, both members of the medical profession, to whom great sympathy will be extended.

## WILLIAM ROBERTSON LOGAN, M.D., F.R.C.P.Ed.

Dr. William Robertson Logan died at Edinburgh on July 22 after a very brief illness. He was 60 years of age. He was a native of Kelso and was educated there and later at George Watson's College, Edinburgh. He studied medicine at the University of Edinburgh, and graduated M.B., Ch.B. in 1909. His interests lay in the laboratory side of medicine, especially in pathology and bacteriology, and he was for a time assistant in pathology with Professor J. Lorrain Smith. In 1913 he gained his M.D. (with high commendation), and about this period studied for a time in Paris. During the first world war he served in the R.A.M.C., acting as bacteriologist in East Mudros with the M.E.F., and later being in charge of the laboratory of the 42nd General Hospital at Salonika.

After the war he became bacteriologist to the Royal Infirmary at Edinburgh, a post he held until his death. In 1919 he was elected F.R.C.P.Ed., and in 1925 he obtained his D.P.H. During his long tenure of the position of bacteriologist to the Edinburgh Royal Infirmary, Dr. Logan produced a number of useful papers on bacteriological subjects. For many years he was a member of the laboratory committee of the Royal College of Physicians and gave useful advice in his own quiet way. He was a member of the Pathological Society of Great Britain and Ireland, of the Edinburgh Pathological Club, and of the British Medical Association. In 1927 he was Vice-President of the Section of Pathology and Bacteriology at the Annual Meeting in Edinburgh of the B.M.A.

Logan was of a quiet retiring nature, never seeking the limelight and shy of voicing his opinion, but always ready to help his colleagues in bacteriological problems. His other interests were gardening and golf, which he played well. For a number of years he lived in Colinton, where he had a beautiful garden tended largely by himself. It was one of his great regrets that owing to the state of his health in the last year or so he had to give up both his gardening and his golf. Dr. Logan leaves a widow, to whom deep sympathy will be extended.

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Dr. HAROLD ERNEST KITCHEN died suddenly on July 4 at the age of 71. A student at Cambridge and St. Mary's Hospital, he qualified in 1906.

Dr. Kitchen went to the Isle of Man in 1912, settling first in Douglas and later moving to Ramsey, where he remained in practice up to the time of his death. He was elected a member of the Isle of Man Medical Society in 1913, and at once took an active part in its affairs, reading a paper on "Strange Remedies" in that year. During the five years from 1919–24 he was secretary of the society and played a prominent part in

the negotiations over the implementing of the health insurance scheme, the introduction of which into the island had been delayed by the war. So much were his efforts appreciated that the society elected him as a director of the Manx Health Society, a post he continued to fill up to the time of his death on July 4, the day before the National Health Service began to operate. Thus, throughout the whole of this long period he upheld the prestige of the profession as the society's representative. He attended the annual representative meeting in the centenary year of the British Medical Association while president of the society, which had in that year amalgamated with the recently created Isle of Man branch of the British Medical Association. Dr. Kitchen always took great interest in the work of the branch. Dying as he did in the middle of a turbulent meeting of the society, shortly after he had expressed himself in forthright terms, his colleagues have been left with a characteristic picture of Dr. Kitchen, ever ready to take up the fight where the honour and well-being of the profession were concerned.

Dr. LEGH RICHMOND HERBERT PETER MARSHALL, who died on July 10, was the only son of the late Dr. Henry Marshall, of Clifton, Bristol. Before studying medicine at Edinburgh University he spent some years abroad tea-planting. He graduated M.B., Ch.B. in 1907 and took his M.D. two years later, being highly commended for his thesis. After graduation he held appointments at the Deaconess Hospital, the Royal Infirmary, Edinburgh, and the Edinburgh City Fever Hospital. Thereafter he settled down in general practice in Peebles and district. At the beginning of the National Health Insurance scheme Dr. Marshall, on principle, declined to enter the service. He retained, however, an extensive practice in the surrounding district. For a number of years he was medical officer of the local child-welfare clinic. During the war of 1914–18 he served for three years in East Africa, being twice mentioned in dispatches and awarded the O.B.E. for his services. Dr. Marshall was a member of the B.M.A. for forty years, and was chairman of the South-Eastern Counties Division in 1931–2. He retired from practice some 12 years ago and resided in Edinburgh to within a few months of his death. During the last war, however, he was active in recruitment medical board work and at an A.R.P. first-aid post. He was a keen churchman, and was in particular associated with the executive committee, the Theological College, and the Overseas Mission Board of the Scottish Episcopal Church. The sympathy of all who know her is extended to his widow in her loss.

Dr. G. A. Auden writes: In the obituary notice of Dr. A. L. S. TUKE (June 19, p. 1212) no mention is made of his services in Gallipoli. At the time of the great blizzard and floods of Nov. 26–7, 1915, the Fife and Forfar Yeomanry were in the trenches. The official history of the campaign gives the number of casualties as 189 men drowned or dead from exposure and some 8,000 evacuated for frost-bite. There was necessarily much confusion, but Tuke worked all night and the following day in collecting the casualties and passing them on to the field ambulances. I have vivid recollections of seeing him on the 27th, cheerful and imperturbable, and quite indifferent to his own physical hardships. This notable service should be placed on record.

# Medico-Legal

## DAMAGES FOR LOSS OF SENSE OF SMELL

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

The chief clerk of the Cambridge regional petroleum office was thrown from an Eastern Counties bus (in the days when buses were run by companies) through the negligence of one of the company's servants, and his skull was fractured. When he recovered, his sense of smell was gone for ever. Mr. Justice Croom-Johnson awarded him £750 damages, remarking that for a gardener of 58 to be unable to enjoy the perfume of the flowers he grows is a serious affliction. Some readers may be more impressed by the handicap the patient himself mentioned in evidence, that he could not now distinguish between the smoke of a cigar and that of a cigarette. Few of us nowadays get the chance to do anything of the sort, but to be deprived of the joy of smoking even cigarettes may for some be more grievous than to be unable to smell a rose.

# Universities and Colleges

## UNIVERSITY OF OXFORD

Arthur Duncan Gardner, D.M., F.R.C.S., has been appointed Regius Professor of Medicine in succession to Arthur William Mickle Ellis, O.B.E., D.M., F.R.C.P., who has retired.

## UNIVERSITY OF CAMBRIDGE

On July 26 the honorary degree of D.L. was conferred on Thomas Benjamin Davie, M.D., F.R.C.P., Principal and Vice-Chancellor of the University of Capetown.

## QUEEN'S UNIVERSITY, BELFAST

The following medical degrees were conferred at the summer graduation on July 9:

M.D.—[1]W. M. Brown, [1]M. W. Johnstone, [1][2]Maureen E. McNeill, M. W. J. Boyd, W. L. Burrowes, H. Donnelly, Elisabeth Elliott, Linde E. U. Ewald, W. A. Kennedy, [2]B. E. McConnell, [2]J. McConnell, T. R. Malloy, J. H. McK. Pinkerton, D. Rooney, C. D. Ross, [2]J. Schrager, R. G. Vine, E. L. Wilson.

M.CH.—J. T. Shepherd (awarded gold medal).

M.B., B.CH., B.A.O.—J. J. W. Barr, T. M. Carey, J. A. Cornett, D. Davies, D. F. Donaghy, D. D. Ellis, F. W. M. Emery, W. E. Flewett, J. Gallagher, Moira P. Gilmore, T. L. Gracey, J. Henry, Anna F. S. Johnston, G. A. Kernohan, G. Lynch, P. C. McCrea, S. C. Cullough, W. M. M. McGimpsey, B. W. McKinley, F. V. Macaulay, Esmee D. Martin, Phyllis A. E. Meeke, J. D. Montgomery, W. F. K. Morrow, P. O'Connell, W. T. Orton, Eileen D. M. H. Poots, T. P. Sharp, Esther R. Shrage, W. E. Stafford, J. B. Taylor, J. B. Thompson.

[1] With commendation. [2] In absentia.

## ROYAL COLLEGE OF PHYSICIANS OF LONDON

At a quarterly comitia of the College, held on July 29, with the President, Lord Moran, in the chair, the following Fellows were elected officers for the ensuing year: *Censors*, Donald Hunter, J. Crighton Bramwell, J. F. Smith, R. V. Christie; *Treasurer*, W. G. Barnard; *Registrar*, H. E. A. Boldero; *Harveian Librarian*, Archibald Gilpin; *Assistant Registrar*, W. D. W. Brooks.

Dr. Geoffrey Marshall was appointed Harveian Orator and Dr. J. G. Scadding Bradshaw Lecturer, both for 1949. The following lecturers were also appointed: Lumleian (1949), Dr. A. P. Thomson; Goulstonian (1949), Dr. C. Gavey; Oliver-Sharpey (1949), Professor H. P. Himsworth; Charles West (1949), Dr. N. B. Capon; F. E. Williams (1949), Dr. J. H. Sheldon; Ernestine Henry (1949), Dr. Donald Hunter; Croonian (1950), Dr. A. E. Clark-Kennedy.

The Registrar announced that the Murchison Scholarship had been awarded to Mary C. Holt, M.B.; the Moxon Medal to Dr. N. Hamilton Fairley for his contribution to the understanding of the blood pigments and for his work on malaria; and the Weber-Parkes Prize to Dr. Stephen Roodhouse Gloyne, for his work on the morbid anatomy of pulmonary tuberculosis and its differentiation from diseases due to dust.

Lord Moran was elected the College representative on the governing body of the British Postgraduate Medical Federation and Dr. A. E. Naish the College representative on the Court of the University of Sheffield.

The following, having satisfied the Censors' Board, were elected Members of the College:

Z. H. Abdeen, M.B., J. C. L. Adams, M.B., A. K. S. Ahmed, M.B., A. Allison, M.B., R. P. Aronson, M.B., D. V. Bates, M.B., J. M. Beare, M.D., T. P. Blanshard, M.D., A. W. Branwood, M.D., F. S. W. Brimblecombe, M.B., K. P. Brown, M.B.E., M.B., Major, R.A.M.C., G. N. Chandler, B.M., M. V. Chari, M.B., E. K. Cruickshank, M.B., M. Daniels, M.D. (in absentia), S. Davis, M.B., F/Lt., R.A.F., G. K. Dhariwal, M.B., R. S. Duff, M.B., P. R. Duncan, M.B., J. H. Ebbs, M.D. (in absentia), M. M. El-Mehairy, M.B., N. B. Finter, M.B., C. D. Garratt, M.B., D. H. Garrow, B.M., I. C. Gilliland, M.B., B. Golberg, M.B., Helen C. Grant, M.B., G. S. Gray, M.B., T. Hanley, M.B., Audrey Hanson, M.B., J. F. J. Hickey, M.B., C. K. Hirson, L.R.C.P., G. E. Honey, B.M., D. A. Howell, L.R.C.P., P. Jacobs, M.B., L. Jacobson, M.B., B. A. G. Jenkins, M.B., J. H. P. Johnson, M.B., J. G. P. Jones, M.B., R. M. Kamel Refai, D.M., J. A. Keeling, M.B., S. E. Keidan, M.B., W. L. R. Kenyon, M.B., I. Kessel, M.B., J. A. Kilpatrick, M.D., S. G. E. Laverty, M.B., C. W. Lawson, M.B., Theresa Lazar, M.B., R. F. L. Logan, M.D., S. Lopis, M.D., E. M. Lourie, M.B., J. MacW. MacGregor, M.R.C.P.Ed., A. G. McManis, M.B., W. B. D. Maile, M.D., B. M. Mandelbrote, M.B., J. Marshall, M.B., M. M. Martin, M.B., R. Martlew, M.B., W. J. Matheson, M.B., Edith M. Metcalfe, M.B., R. G. Miller, M.B., G. Monckton, M.B., P. D. Moss, M.B., R. Mulcahy, M.B., L. A. M. B. Musso, M.B., T. E. Oppe, M.B., J. S. Pegum, M.B., J. S. Prichard, *M.C.*, M.B., A. W. S. Ritchie, M.B., W. Robinson, *M.C.*, M.D., W. J. B. Rogers, M.B., A. Russell, O.B.E., M.B., J. B. G. Russell, M.B., A. Z. Shafei, M.B., R. A. Shanks, M.B., N. Shapiro, M.B., D. Sheehan, M.D., J. P. Shillingford, M.D., W. Sircus, M.B., T. G. Smillie, M.B., F. R. Staub, M.D., P. V. Suckling, M.B., J. M. Swithinbank, M.D., Mary Townsend, M.B., L. H. Truelove, B.M., D. H. Turnbull, M.B., S. Vaisrub, M.D., D. D. Vora, M.D., Betty Walker, M.B., J. B. Walter, M.B., G. M. Watson, M.B., J. M. Watt, M.B., G. H. Wattley, M.B., R. Wigglesworth, M.B., O. G. Williams, M.B., R. B. N. Wilsdon, M.B., S. R. Wood, M.B.

Licences to practise were conferred upon the following 149 candidates (including 25 women) who had passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Board and who have complied with the necessary by-laws:

C. P. T. Alexander, M. J. Allwood, W. B. Ashby, R. H. R. Aston, Pamela M. Aviss, J. C. Barker, M. D. Begley, J. R. Bennett, S. Y. Bhagwat, J. M. Bishop

G. C. Blake, R. I. K. Blyth, W. O. Bradbury, M. A. Brennan, W. S. Brown, R. W. Buckley, P. I. Busfield, Anthea M. Bushby, P. J. A. Butcher, H. F. Cantwell, A. J. E. Cater, I. Chance, P. J. C. Chapman, Suzanne K. R. Clarke, Sybil M. Cockersell, H. Collier, J. L. Cotton, D. N. Cow, D. T. Cox, Katherine S. M. Crouch, D. J. Crowther, Mary E. Curling, Katharina D. Dalton, F. J. Davies, H. F. Davies, N. C. R. Davies, F. A. de Hamel, Evelyn F. P. Dennett, J. A. L. Derlien, A. J. De Villiers, D. J. Douglass, G. E. Dower, E. C. Edwards, D. K. Evans, S. Fahmy, P. Fehrsen, E. J. F. Filose, R. A. Fox-Linton, P. B. Foxwell, P. N. Gai, Phyllis A. George, J. A. H. Goldacre, Barbara M. Gray, A. M. Green, E. J. Hargadon, G. L. Harper, M. Hatton, J. T. Hemingway, C. A. Higgins, J. F. Hindle, H. Hollis, P. L. Holman, Jean M. Horton, J. Humphreys, O. A. N. Husain, Rosemary Huxley-Williams, R. B. Jackson, F. E. James, A. G. Jarrams, G. Jones, J. H. Jones, Nesta J. Jones, C. H. G. Kendall, K. J. Kingsbury, J. Koszyk, N. Lawrence, A. Lebedeff, A. J. Lee, A. H. Levy, R. L. Lindon, H. A. Lomax, M. D. Lord, R. A. McGregor, J. W. R. McIntyre, S. A. Mannan, N. C. March, M. F. P. Marshall, A. P. Maruff, D. Mendel, Marie D. Merchant, A. R. Merrill, J. A. R. Moody, W. P. C. R. Moody, G. Morgan, K. Z. Novak, P. O. Oliver, G. R. Outwin, S. Panikkar, D. F. Parkin, C. A. Parsons, P. R. Persey, D. L. Postlethwaite, Elizabeth Preston-Thomas, Deonarine Ramdin, J. Rankin, E. G. Rees, W. S. Richardson, Janet P. Rickard, D. G. B. Riddick, D. P. Rough, G. J. Schiller, D. L. Sladden, B. H. Smith, R. W. Smithells, R. S. Snell, R. Southwell, W. F. W. Southwood, C. K. Spalding, J. R. Spears, R. A. Stanger, Rosemary Stephens, Alice H. Stokes, J. W. M. Stone, J. L. V. Summerhayes, E. F. Swift, Margaret N. A. Tew, R. G. Thomas, A. H. Thompson, J. B. Turtle, P. H. Venn, A. F. Verney, J. D. Villiers, D. L. Walker, C. Waller, Daphne M. L. Walters, D. B. J. Wardle, W. K. M. C. Watkins, W. F. Weatherill, M. A. Weller, Audrey M. Wells, Margaret M. Whitaker, J. H. McN. White, Margaret P. Whittaker, Freda M. Wilcox, I. L. Wilkinson, J. L. Wilkinson, H. O. Williams, A. J. Woolf, Mary I. Wray.

Diplomas in Medical Radiotherapy were granted to the ten successful candidates whose names were printed in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of June 26 (p. 1264); as were the names of the 32 recipients of the Diploma in Medical Radio-Diagnosis.

Diplomas in Psychological Medicine were granted to the 20 successful candidates whose names were printed in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of August 7 (p. 317); as were the names of the 16 recipients of the Diploma in Laryngology and Otology.

Diplomas in Public Health were granted to the 24 successful candidates whose names are printed in the report of the meeting of the Royal College of Surgeons of England below; as are the names of three of the 40 recipients of the Diploma in Anaesthetics (the names of the other 37 successful candidates were printed in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of August 7 (p. 317)).

## ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the College on July 29, with Lord Webb-Johnson, President, in the chair, the John Tomes Prize for 1945–7 was awarded to Professor H. H. Stones in recognition of his distinguished research in the field of dental pathology. The Hallett Prize was awarded to T. P. S. Powell (University of Edinburgh) on the result of the recent primary examination for the Fellowship.

Diplomas of Membership were granted to the following successful candidates:

C. P. T. Alexander, M. J. Allwood, W. B. Ashby, R. H. R. Aston, Pamela M. Aviss, J. C. Barker, M. D. Begley, J. R. Bennett, S. Y. Bhagwat, J. M. Bishop, G. C. Blake, R. I. K. Blyth, W. O. Bradbury, M. A. Brennan, W. S. Brown, R. W. Buckley, P. I. Busfield, Anthea M. Bushby, P. J. A. Butcher, H. F. Cantwell, A. J. E. Cater, I. Chance, P. J. C. Chapman, Suzanne K. R. Clarke, Sybil M. Cockersell, H. Collier, J. L. Cotton, D. N. Cow, D. T. Cox, Katherine S. M. Crouch, D. J. Crowther, Mary E. Curling, Katharina D. Dalton, F. J. Davies, H. F. Davies, N. C. R. Davies, F. A. de Hamel, Evelyn F. P. Dennett, J. A. L. Derlien, A. J. De Villiers, D. J. Douglass, G. E. Dower, E. C. Edwards, D. K. Evans, S. Fahmy, P. Fehrsen, E. J. F. Filose, R. A. Fox-Linton, P. B. Foxwell, P. N. Gai, Phyllis A. George, J. A. H. Goldacre, Barbara M. Gray, A. M. Green, E. J. Hargadon, G. L. Harper, M. Hatton, J. T. Hemingway, C. A. Higgins, J. F. Hindle, H. Hollis, P. L. Holman, Jean M. Horton, J. Humphreys, O. A. N. Husain, Rosemary Huxley-Williams, R. B. Jackson, F. E. James, A. G. Jarrams, G. Jones, J. H. Jones, Nesta J. Jones, C. H. G. Kendall, K. J. Kingsbury, J. Koszyk, N. Lawrence, A. Lebedeff, A. J. Lee, A. H. Levy, R. L. Lindon, H. A. Lomax, M. D. Lord, R. A. McGregor, J. W. R. McIntyre, S. A. Mannan, N. C. March, M. F. P. Marshall, A. P. Maruff, D. Mendel, Marie D. Merchant, A. R. Merrill, J. A. R. Moody, W. P. C. R. Moody, G. Morgan, K. Z. Novak, P. O. Oliver, G. R. Outwin, S. Panikkar, D. F. Parkin, C. A. Parsons, P. R. Persey, D. L. Poslethwaite, Elizabeth Preston-Thomas, D. Ramdin, J. Rankin, E. G. Rees, W. S. Richardson, Janet P. Rickard, D. G. B. Riddick, D. P. Rough, G. J. Schiller, D. L. Sladden, B. H. Smith, R. W. Smithells, R. S. Snell, R. Southwell, W. F. W. Southwood, C. K. Spalding, J. R. Spears, R. A. Stanger, Rosemary Stephens, Alice H. Stokes, J. W. M. Stone, J. L. V. Summerhayes, E. F. Swift, Margaret N. A. Tew, R. G. Thomas, A. H. Thompson, J. B. Turtle, P. H. Venn, A. F. Verney, J. D. Villiers, D. L. Walker, C. Waller, Daphne M. L. Walters, D. B. J. Wardle, W. K. M. C. Watkins, W. F. Weatherill, M. A. Weller, Audrey M. Wells, Margaret M. Whitaker, J. H. McN. White, Margaret P. Whittaker, Freda M. Wilcox, I. L. Wilkinson, J. L. Wilkinson, H. O. Williams, A. J. Woolf, Mary I. Wray.

Diplomas in Public Health and in Anaesthetics were granted jointly with the Royal College of Physicians of London to the following successful candidates:

DIPLOMA IN PUBLIC HEALTH.—E. H. Annels, F. Bell, R. Calderwood, S. P. C. Casey, R. M. Coplans, E. J. Crowe, P. C. Dismorr, J. L. Fluker, A. W. Gilbert, J. L. Gordon, F. L. Groarke, Marjory I. H. Isaac, L. F. Jepson, A. F. H. Keatinge, J. W. McConachie, A. C. McLeish, M. Price, H. Richards, Peggy J. C. Roberts, Margaret I. Ross, G. G. Sheriff, M. I. Silverton, R. A. Smart, Ruth M. West.

DIPLOMA IN ANAESTHETICS.—G. E. Badock, T. H. S. Burns, J. R. S. Shields.

The following hospitals were recognized under Paragraph 23 of the Fellowship regulations: St. Bartholomew's Hospital, Rochester (resident surgical officer and two house-surgeons); Victoria Hospital, Worksop (resident surgical officer).

### FACULTY OF ANAESTHETISTS

The recently established Faculty of Anaesthetists of the Royal College of Surgeons of England has instituted a Fellowship of the Faculty (F.F.A., R.C.S.) which is being awarded by election and not by examination to medical practitioners who have made distinguished contributions to anaesthetics. The following are the members of the Board of the Faculty: Dr. A. D. Marston (Dean), Dr. Bernard R. M. Johnson (Vice-Dean), Dr. I. W. Magill, Dr. E. S. Rowbotham, Dr. C. Langton Hewer, Dr. R. E. Pleasance, Dr. W. Alexander Low, Dr. Frankis T. Evans, Dr. John Gillies, Professor R. R. Macintosh, Dr. J. H. T. Challis, Dr. George Edwards, Dr. Katherine G. Lloyd-Williams, Dr. B. L. S. Murtagh, Dr. A. H. Musgrove, Dr. H. J. Brennan, Dr. Vernon F. Hall, Dr. Ronald F. Woolmer, Dr. G. S. W. Organe, Dr. T. Cecil Gray, and Dr. E. A. Pask.

The first Fellows have been elected as follows: Helen B. Alcock, R. E. Apperly, Philip Ayre, Freda Bannister, R. A. Beaver, J. Blomfield, John Boyd, E. G. Bradbeer, R. J. B. Broad, G. Maxwell Brown, F. F. Cartwright, J. N. Cave, L. T. Clarke, R. J. Clausen, R. W. Cope, H. P. Crampton, A. S. Daly, C. J. Massey Dawkins, I. M. Campbell Dewar, H. W. Featherstone, D. Keir Fisher, R. Blair Gould, C. F. Hadfield, E. M. Handfield-Jones, R. P. Harbord, T. A. B. Harris, J. K. Hasler, B. P. Hill, E. Falkner Hill, M. W. P. Hudson, C. H. M. Hughes, John T. Hunter, Ronald Jarman, E. F. Johnson, W. J. Bennett Jones, Alison R. Kerridge, E. Landau, J. A. Lee, A. Goodman Levy, W. S. McConnell, V. O. McCormick, R. Machray, J. Ross Mackenzie, R. E. Mansfield, Z. Mennell, Edith J. Millar, Arthur Mills, R. J. Minnitt, C. W. Morris, L. H. Morris, H. J. V. Morton, W. W. Mushin, M. D. Nosworthy, G. R. Phillips, H. H. Pinkerton, K. B. Pinson, A. F. Potter, W. B. Primrose, R. J. Probyn-Williams, B. Rait-Smith, H. A. Richards, E. H. Rink, Alison Ritchie, F. W. Roberts, S. Thompson Rowling, J. F. Ryan, E. A. Scott, W. M. Shearer, Sir Francis Shipway, O. L. C. Sibley, H. Sington, G. F. Rawdon Smith, R. L. Soper, C. E. Sykes, V. E. Vessell, F. F. Waddy, Sheina C. H. Watters, H. N. Webber, Humphrey B. Wilson, H. Bruce Wilson, H. Woodfield-Davies.

## ROYAL COLLEGE OF SURGEONS OF EDINBURGH

At a meeting of the Royal College of Surgeons of Edinburgh held on July 28, with Mr. Frank E. Jardine, President, in the chair, the following candidates, having passed the requisite examinations, were admitted Fellows: S. J. Aptekar, H. W. C. Bailie, D. M. Bell, W. N. Boyd, W. Brydone, D. E. Coyle, D. D. G. Curran, K. A. Dalal, V. J. Downie, V. K. Drennan, J. Evans, G. C. Farrington, R. Finney, G. E. Fordyce, J. M. Gold, D. F. P. Gordon, J. P. W. Grant, T. G. Gray, F. S. Gregory, J. Grieve, O. E. Hansen, G. V. Harry, A. H. Haysom, T. Hunter, J. B. Jack, W. McK. S. Kelso, M. S. Khan, D. Laing, D. M. Lithgow, D. J. Livingstone, A. W. K. Main, A. Mills, J. Macpherson, A. W. MacQuarrie, P. M. Naidu, R. G. Patel, V. R. Rob, F. Selim, A. McE. Smith, Felicity E. Soutter, D. G. Steer, E. V. Strisiver, P. J. Tarpey, R. D. Wilkins, J. W. Wilson.

The Henry Arthur Dalziel Ferns Bursary was, after a competitive examination in organic chemistry in its application to medicine, awarded to John P. Laidlaw.

# The Services

Major-General Sir Robert Hay, K.C.I.E., late I.M.S., has relinquished the appointment of Honorary Physician to the King, on retirement.

The following decorations have been conferred by the President of the U.S.A. in recognition of distinguished services in the cause of the Allies:

*Medal of Freedom with Silver Palm.*—Colonel (Temporary) G. M. Frizell, T.D., R.A.M.C.

*Bronze Star.*—Brigadier (Temporary) A. A. Eagger, C.B.E., R.A.M.C.; Colonel (Temporary) J. C. Gilroy, O.B.E., R.A.M.C.; Major E. S. Rowbotham, R.A.M.C.

Surgeon Lieutenant-Commanders R. W. Smith, R.N.V.R., and D. R. Maitland, R.N.V.R. (ret.), have been awarded the R.N.V.R. Decoration.

The Efficiency Decoration of the Territorial Army has been conferred upon Majors (Hon. Lieutenant-Colonels) J. L. Orr, R. Ropner, and R. J. Watson, M.C. (T.A.R.O.), and on Majors W. H. Dowell and M. L. Formby.

# Medical Notes in Parliament

### Poisons Rules

Mr. E. P. SMITH on July 29 again moved a motion for the annulment of the Poisons (Amendment) (No. 2) Rules, 1948. The same motion had been counted out on July 26. Mr. Smith said that, apart from women, the worst poisoners had all been male doctors. He questioned the adequacy of the safeguards in paragraph 2 of the order, which authorized the supply without a prescription of poison to a duly qualified medical practitioner who in an emergency was unable to furnish a prescription immediately. A prescription in writing must follow within 24 hours. Mr. Smith read extracts from a memorandum submitted by the Home Office to the Select Committee on Statutory Rules and Orders. This memorandum referred to a disagreement between doctors and chemists on the practice of telephoning prescriptions, the doctors wanting some relaxation and the chemists being opposed to it. The Poisons Board at first came down on the side of the chemists, but in 1947 recommended the adoption of a draft rule allowing prescribing by telephone. The Home Office referred the matter back to the Poisons Board in consequence of the growing number of deaths from barbiturate poisoning. Eventually the Board's recommendation in a modified form had been embodied in the proposal. At the same time restrictions on the sale of Fourth Schedule poisons were increased.

Mr. YOUNGER, replying for the Home Office, said the part of the Order questioned by Mr. Smith referred to Fourth Schedule poisons. Mr. Younger had no information to suggest that these had recently been used by poisoners or that poisoners had attempted to get hold of them. These poisons were required for medical treatment, and the Home Office had to take account of the legitimate needs of doctors and hospitals. The Poisons Board and the Home Secretary had considerably tightened the rules on the repetition of prescriptions and thereby reduced the facilities for people to obtain these drugs. At the same time one small relaxation had been made to meet legitimate cases of emergency. This relaxation had a parallel in the existing rules dealing with the more dangerous poisons under the First Schedule. In that case the rule had worked well. The Home Office had to depend on the common sense of the pharmacists. If they were not sensible or became corrupt the whole control broke down. There was reason to suppose that where the drug was urgently needed and it was impossible to get the prescriptions provided in advance there had been collusion between the doctor, the pharmacist, and the patient to provide that prescription. It was not good to bring the law into disrepute by retaining this restriction. It was unlikely that any pharmacist called to supply a drug in this way without a prescription would supply sufficient for a fatal dose.

Mr. Smith withdrew his motion.

### Acts

Before Parliament adjourned for the Summer Recess on July 30 the Royal Assent was signified to the Criminal Justice Act, Factories Act, National Insurance (Industrial Injuries) Act, Nurseries and Child Minders (Regulations) Act, Statute Law Revision Act, and the Veterinary Surgeons Act.

*Women Medical Students.*—Approximately 2,875 women medical students, representing about 27% of the total, are now attending medical schools in Great Britain. There are no schools without women students.

*Report on Midwifery.*—The Minister of Health hopes to receive the report of the working party on midwifery in September.

*Deaf-aids.*—Up to July 26, 1,680 Medresco deaf-aids had been delivered from the manufacturers, and 1,200 had been issued to hospitals in England and Wales.

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The first issue of an international journal of comparative physiology and oecology, *Physiologia Comparata et Oecologia*, has recently been published at The Hague. It has an international board of editors, and it is intended to publish the results of investigations in the fields of comparative physiology and oecology of vertebrates and invertebrates. Articles may be submitted in English, French, or German; those written in French must have an additional summary in English, those written in English or German an additional summary in French. The first number contains among other papers a description of an *x*-ray study of the intestinal movements of the hen and some observations on the breeding of hares in captivity. *Physiologia Comparata et Oecologia* is a well-produced journal; the paper and printing are both good. Britain is represented on the editorial board by C. F. A. Pantin, of Cambridge, and C. M. Yonge, of Glasgow.

# Medical News

### Honour for Belfast Hospital

His Majesty the King has commanded that the Belfast Hospital for Sick Children shall be known as the Royal Belfast Hospital for Sick Children. The hospital was founded in King Street in 1873, and six years later it was removed to the Old Queen Street Hospital. The present building was opened in 1932.

### Memorial to the late Dr. J. W. Hunter

On July 28 two memorial plaques to the late Dr. John William Hunter, medical officer of health and school and port medical officer at Ipswich, who died on August 26, 1947, were unveiled at the Borough General Hospital by his two sons. An obituary notice of Dr. Hunter was published in the *Journal* of September 20, 1947 (p. 471).

### The Medical Directory

The publishers of the *Medical Directory* (Messrs. J. and A. Churchill, Ltd., 104, Gloucester Place, London, W.1) will be glad to send their schedule asking for particulars, on which they rely to maintain the accuracy of the volume, to any member of the medical profession who has not received one or who has mislaid it.

### Freedom of the Press

The Central London Branch of the National Union of Journalists has adopted a resolution protesting strongly against the threat to the freedom of the Press contained in the recommendation of the British Medical Association on June 29, 1948, that:

"Because of the dangers of imitative suicide, all inquests shall be held in public, but, in an inquest on a suicide, the Press be prohibited from publishing an account of the proceedings, and permitted only to publish that an inquest had been held, the name and address of the deceased, and a verdict that the deceased died by his own hand."

### Streptomycin Treatment in Scotland

Arrangements have now been completed by Regional Hospital Boards in Scotland for the extension of hospital facilities for the streptomycin treatment of persons suffering from tuberculous meningitis and acute miliary tuberculosis. Beds for this purpose have been set aside in selected hospitals in each region and streptomycin is being supplied by the Department of Health for Scotland. Medical practitioners seeking admission for patients suffering from these conditions should apply direct to the nearest treatment centre or to the offices of the appropriate Regional Hospital Board. In the Glasgow area admission can be arranged by telephone application to Glasgow Central 9600. The hospitals in Scotland where this treatment can be given are: Western Region: Ruchill Hospital, Glasgow; Belvidere Hospital, Glasgow; Robroyston Hospital, Glasgow; Mearnskirk Hospital, Newton Mearns; Knightswood Hospital, Glasgow; Royal Hospital for Sick Children, Glasgow; Motherwell Infectious Diseases Hospital, Motherwell; Hairmyres Hospital, East Kilbride; Stonehouse Hospital; Paisley Infectious Diseases Hospital; Gateside Hospital; Central Hospital, Ayrshire; Falkirk Royal Infirmary, Falkirk; Lochmaben Sanatorium. South-Eastern Region: Bangour Hospital, West Lothian. Southfield Sanatorium, Liberton, Edinburgh, and Cameron Hospital, Fife, will be able to accept cases in the near future. Eastern Region: King's Cross Hospital, Dundee. North-Eastern Region: City Hospital, Aberdeen. Northern Region: Culduthel Infectious Diseases Hospital, Inverness.

### Streptomycin Regulations

Regulations (the Streptomycin Regulations, 1948) have been made by the Minister of Health, the Secretary of State for Scotland, and the Minister of Health and Local Government for Northern Ireland, after consultation with the Medical Research Council, bringing streptomycin within the scope of the Penicillin Act, 1947. The effect of these regulations, which came into force on Aug. 1, is that streptomycin and preparations containing streptomycin may be supplied to the public only by or in accordance with the directions of doctors, dentists, or veterinary surgeons, or by registered pharmacists on the prescription of doctors, dentists, or veterinary surgeons, and may be administered only by, or in accordance with, the directions of such qualified practitioners. Though supplies of streptomycin have increased, it is still generally available only through the hospital service. The regulations anticipate the time when its use may be extended.

As with penicillin and preparations containing penicillin, pharmacists and authorized sellers of poisons will be able normally to dispense a prescription for streptomycin and preparations containing streptomycin only once and not more than three months after the prescription was given; if, however, the prescription directs that it may be dispensed on a specified number of occasions or at specified intervals in a specified period, it may be dispensed in accordance with that direction.

### Northern Ireland Health Services

The present address of the Northern Ireland General Health Services Board is 27, Adelaide Street, Belfast.

### Professor T. Pomfret Kilner

Professor T. Pomfret Kilner, Director of the Nuffield Department of Plastic Surgery, University of Oxford, has been elected an Honorary Fellow of the American Association of Plastic Surgeons.

### Standard Sizes for X-ray Films

The British Standards Institution has recently issued B.S.1443, which specifies the size of *x*-ray film and intensifying screens, together with internal sizes of cassettes, adopted for future use. The Standard was prepared at the request of the manufacturers of *x*-ray equipment and accessories, who have had to meet the needs not only of medical and industrial users in this country but were also faced with the necessity of producing equipment adapted for metric sizes for the export trade. The committee charged with this work has found it possible to provide satisfactorily for all uses with a range of ten inch-sizes and six metric-sizes, and these sixteen sizes will replace more than thirty formerly in use in this country. The Standard specifies minimum and maximum cutting sizes for *x*-ray film and intensifying screens, and also provides for a standard minimum size of cassettes. Films and screens of these sizes will be usable in all existing equipment.

### Diphtheria and Vaccination Returns

The Ministry of Health has notified local authorities of the diphtheria and vaccination returns required after July 5. As at present there will be two forms of return for diphtheria immunization—six-monthly and yearly. There will also be an annual return stating the number of persons vaccinated during the year. In addition special reports will be required about individual immunized children who die of diphtheria, and about cases of vaccination associated with generalized vaccinia, post-vaccinal encephalomyelitis, and deaths from other complications.

### Wills

Dr. Charles Francis Orr White, of Dial House, New Inn Lane, Burpham, Guildford, left £45,569. Dr. Walter Rupert Reynell, of London, W.1, left estate in England valued at £27,911.

## COMING EVENTS

### Mental Health Exhibitions

Throughout the International Congress on Mental Health, which is being held in London between August 11 and 21, two exhibitions are on view in connexion with the session on Cultural Activities in Mental Hospitals. These are "Art and Occupational Therapy," at the County Hall, Westminster Bridge, S.E.1, and "Patients' Libraries and Pictures in Hospitals," at 1, Grosvenor Crescent, S.W.1.

### Medical Week in Hungary

The Hungarian Medical Trade Union is arranging a Medical Week from Sept. 4 to 12 as part of the celebrations of the Hungarian War of Liberty in 1848. Information may be obtained from the Centenary Congress Committee, Bokay Janos u. 53, Budapest, 8, Hungary.

### Venereal Diseases Congress

The International Union against Venereal Diseases will celebrate its 25th anniversary at the General Assembly to be held in Copenhagen on September 6–10. The Assembly will consider plans for the international control of venereal disease and human behaviour in relation to its control. Further information may be obtained from Miss Marguerite Troue, Administrative Secretary, Institut Fournier, 25, Boulevard Saint-Jacques, Paris XIV.

### Speech Therapy Conference

A Conference on Speech Therapy, arranged by the College of Speech Therapists (68, Queen's Gardens, London, W.2), will be held at the Royal Society of Medicine, 1, Wimpole Street, London, W., from Sept. 20 to 24, with morning and afternoon sessions every day. Members of the medical profession making contributions to the conference are as follows: Dr. Leopold Stein, "The Emotional Background of Stammering"; Dr. Macdonald Critchley, "Speech Disorders arising from Head Injuries"; and Dr. Eleanor M. Creak, "The Role of Emotional Problems in Producing Disorders of Speech." Prof. Henry V. Dicks, Prof. Geoffrey Jefferson, and Dr. W. Russell Brain will be in the chair at three of the sessions. In the evening of Sept. 20 there will be a Government Reception at Lancaster House, St. James's, London, S.W.; the conference dinner will be held on Sept. 21; and in the evenings of Sept. 22 and 23 there will be meetings of the conference committee of the College with overseas delegates and representatives to discuss an International Federation of Speech Therapists. Full particulars of the conference may be obtained from the secretary of the College at the above address.

### Sulphur Congress

An International Sulphur Congress will be held on Sept. 13–15, under the presidency of Prof. M. Loeper, at Cauterets, Hautes Pyrénées. Sulphur in relation to the endocrine glands, rheumatism, nutrition, the liver, etc., will be discussed. Information may be obtained from: Docteur Bernard Mothe, Secrétaire Administratif, Président, Directeur Général de l'Union Thermale Pyrénéenne, 12, rue Duplaa, Pau (Basses Pyrénées).

## SOCIETIES AND LECTURES

### Friday

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE.—At Anatomy Lecture Theatre, Edinburgh University, August 20, 3.30 p.m. "*Some Aspects of Urine Secretion*," by Professor E. B. Verney.

## APPOINTMENTS

CARVER, CHARLES, Exhibitions Officer on headquarters staff, Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.

JONES, J. A. LL. VAUGHAN, M.B., Ch.B., Part-time Regional Medical Consultant to the Ministry of Labour and National Service, East and West Riding Regions.

WILSON, H. D., M.B., Ch.B., D.P.H., Assistant Medical Officer of Health, Stirling County Council.

WRIGHT, E. M., B.M., B.Ch., D.P.H., Medical Officer for the City of Salisbury and Assistant Medical Officer for Wiltshire County Council.

## BIRTHS, MARRIAGES, AND DEATHS

### BIRTHS

**Lambah.**—On June 25, 1948, at the Elspeth Nursing Home, Wolverhampton, to Marigold Margaret (née Warner), wife of Captain Ian Lambah, R.A.M.C., a son—Richard.

**McCracken.**—On July 28, 1948, at St. Mary's Hospital, Manchester, to Dr. Margaret (née Laycock) and Dr. Dermot McCracken, a daughter—Elizabeth.

**Mayne.**—On June 24, 1948, at Leinster Private Hospital, Dublin, to Anne, wife of Brian Mayne, M.D., M.R.C.P.I., a son.

**Orford Smith.**—On July 25, 1948, to Mary, wife of Dr. E. S. Orford Smith, of Norwich, a son.

**Parsons.**—On Aug. 3, 1948, at Lynton Nursing Home, Bexhill-on-Sea, to Phyllis Joan (née Fox), wife of Dr. A. C. Devonish Parsons, a sister for Hugh and Guy.

**Scrivener.**—On July 31, 1948, at the Cavendish Nursing Home, Bognor Regis, to Pat (née Rank), wife of Captain J. P. Scrivener, R.A.M.C., a son—James Joseph.

**Vine.**—On Aug. 4, 1948, at the County Hospital, Cambridge, to Denise (née Walden), wife of Dr. Maudsley Vine, a son.

**Watkinson.**—On Aug. 2, 1948, at Park Hospital, Daveyhulme, Lancashire, to Margaret Jean (née Jones), wife of Dr. J. L. K. Watkinson, of 161, Urmston Lane, Stretford, a son—Peter.

### MARRIAGE

**Majury—Huss.**—On July 20, 1948, at St. George's Church, Burrington, Arthur Stuart Majury, M.B., D.R.C.O.G., Belfast, to Edna Margaret Huss, S.R.N., Burrington, Ludlow, Shropshire.

### DEATHS

**Aitken.**—On July 29, 1948, at Prince of Wales Hospital, Plymouth, Alexander Gardner Aitken, M.B., Ch.B.Glas., of Callington, Cornwall.

**Allardice.**—On Aug. 2, 1948, at 8, King Street, Newcastle-under-Lyme, Staffs., William Clachan Allardice, J.P., M.D., F.R.C.S.Ed.

**Andrew.**—On July 29, 1948, at 5, Montpelier Crescent, Brighton, George Andrew, M.D., F.R.C.S., aged 96.

**Cunning.**—On July 29, 1948, at the Wall House, Reigate, Joseph Cunning, F.R.C.S., F.R.A.C.S.

**Esson.**—On July 25, 1948, at Penang, William Henry (Krupp) Esson, J.P., 1914-18 Egypt and France; 1942-5 interned Singapore, dear husband of Isabel Taylor (formerly Dr. Taylor Walsh, Preston, Lancs.).

**Fergusson.**—On Aug. 2, 1948, at Sycamore House, Goldsithney, Cornwall, James Herbert Fergusson, C.B.E., M.R.C.S., L.R.C.P., Surgeon Rear-Admiral, R.N., retired, aged 73.

**Finlayson.**—On July 15, 1948, near Vernon, B.C., Canada, as the result of a motor accident, William Finlayson, M.B., Ch.B.Ed.

**Galloway.**—On Aug. 2, 1948, at Huddersfield Royal Infirmary, William Dawson Galloway, F.R.C.S., aged 58.

**Henry.**—On July 20, 1948, at his home in Glasgow, Stephen John Henry, M.B., Ch.B.Glas., aged 62.

**Kennedy.**—On July 26, 1948, at The Red House, North Bovey, Devon, Charles Matheson Kennedy, M.B.E., F.R.C.S.

**Rusby.**—On Aug. 1, 1948, at 3, Christchurch House, Christchurch Road, London, S.W., Edward Lionel Macpherson Rusby, M.B.

**Stone.**—On July 31, 1948, Robert Dudley Algeo Stone, L.R.C.P.&S.I., of 98, Maison Dieu Road, Dover, aged 85.

**Trythall.**—On Aug. 2, 1948, at 2, Rock Villas, Roche, Cornwall, William Reynolds Trythall, M.R.C.S., L.R.C.P., Surgeon Commander, R.N., retired, aged 75.

**Wace.**—On Aug. 5, 1948, at 99, Ormonde Court, London, S.W., Richard Henry Wace, M.B., C.M.Aberd., aged 80.

**Wainman.**—On July 30, 1948, at 266, Dewsbury Road, Leeds, Wilfred Ernest Wainman, M.R.C.S., L.R.C.P., of Horsforth, aged 52.

**Wyse.**—On July 25, 1948, Harry David Wyse, M.B., B.S., of Cochrane Close, Cochrane Street, St. John's Wood, London, N.W., aged 48.

No. 30

# INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended July 24.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

*Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for:* (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

| Disease | 1948 | | | | | 1947 (Corresponding Week) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (a) | (b) | (c) | (d) | (e) |
| Cerebrospinal fever | 25 | 4 | 10 | 1 | 1 | 31 | — | 23 | 3 | — |
| Deaths | | — | — | | | | — | 1 | | |
| Diphtheria | 139 | 19 | 32 | 15 | 2 | 174 | 15 | 33 | 13 | 2 |
| Deaths | 2 | — | 1 | — | — | 2 | — | — | — | — |
| Dysentery | 108 | 45 | 52 | 1 | — | 61 | 11 | 23 | — | — |
| Deaths | | | | — | — | | | | — | — |
| Encephalitis lethargica, acute | — | — | — | 1 | — | 3 | — | — | — | — |
| Deaths | | 1 | | | | | — | | | |
| Erysipelas | | | 34 | 9 | 3 | | | 22 | 7 | 3 |
| Deaths | | — | | | | | — | | | |
| Infective enteritis or diarrhoea under 2 years | | | | 30 | | | | | 51 | |
| Deaths | 34 | 4 | 8 | 2 | 1 | 61 | 4 | 20 | 3 | 5 |
| Measles* | 8,501 | 552 | 70 | 103 | 53 | 7,644 | 373 | 60 | 332 | 10 |
| Deaths† | | | — | — | 1 | 4 | — | — | — | — |
| Ophthalmia neonatorum | 54 | 5 | 19 | — | — | 55 | 1 | 17 | — | — |
| Deaths | | | | | | | | | | |
| Paratyphoid fever | 9 | — | 1 (B) | — | — | 18 | 2 | — | — | — |
| Deaths | — | — | — | — | — | — | — | 1 | — | — |
| Pneumonia, influenzal | 385 | 20 | 3 | 4 | 6 | 311 | 18 | 1 | 1 | 5 |
| Deaths (from influenza)‡ | 5 | 1 | — | 1 | — | 7 | — | — | | — |
| Pneumonia, primary | | | 122 | 30 | | | | 142 | 15 | |
| Deaths | 127 | 22 | | 4 | 6 | | 17 | | | 7 |
| Polio-encephalitis, acute | 6 | 1 | | | | 34 | 8 | | | |
| Deaths | | | | | | | 2 | | | |
| Poliomyelitis, acute | 39 | 5 | 3 | 2 | 2 | 302 | 51 | 28 | 6 | 7 |
| Deaths§ | 4 | 1 | | | | | 2 | | | |
| Puerperal fever | | 1 | 17 | | 1 | | 1 | 8 | | — |
| Deaths | | | | | | | | | | |
| Puerperal pyrexia‖ | 121 | 10 | 13 | 1 | — | 133 | 6 | 8 | 1 | — |
| Deaths | | — | | | | | — | | | |
| Relapsing fever | — | — | | | — | — | — | | | — |
| Deaths | | | | | | | | | | |
| Scarlet fever | 1,747 | 93 | 245 | 68 | 41 | 987 | 76 | 96 | 25 | 19 |
| Deaths† | | | — | — | — | — | — | — | — | — |
| Smallpox | — | — | — | — | — | — | — | — | — | — |
| Deaths | | | | — | — | | | | — | — |
| Typhoid fever | 13 | 1 | 3 | 1 | — | 8 | 1 | — | 3 | 3 |
| Deaths | — | — | — | — | — | — | — | — | — | 1 |
| Typhus fever | — | — | — | — | 2 | — | — | — | — | — |
| Deaths | | | | — | — | | | | — | — |
| Whooping-cough* | 3,359 | 274 | 14 | 99 | 7 | 1,924 | 233 | 31 | 71 | 4 |
| Deaths | 5 | 1 | 1 | — | — | 5 | 2 | 2 | — | — |
| Deaths (0–1 year) | 253 | 35 | 45 | 14 | 14 | 337 | 41 | 59 | 19 | 12 |
| Infant mortality rate (per 1,000 live births) | | | | | | | | | | |
| Deaths (excluding still-births) | 4,187 | 651 | 533 | 157 | 101 | 3,828 | 596 | 569 | 173 | 100 |
| Annual death rate (per 1,000 persons living) | | | 10·8 | 9·8 | | | | 11·8 | | |
| Live births | 7,863 | 1370 | 1012 | 385 | 251 | 9,124 | 1479 | 1166 | 423 | 268 |
| Annual rate per 1,000 persons living | | | 20·4 | 24·1 | | | | 23·5 | | |
| Stillbirths | 199 | 24 | 31 | | | 248 | 31 | 35 | | |
| Rate per 1,000 total births (including stillborn) | | | 30 | | | | | 29 | | |

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales and Eire.

# EPIDEMIOLOGICAL NOTES

## Paratyphoid at Eastbourne

There have been no new cases notified since Thursday, Aug. 5. The total number of reported cases was 43 on that date. Investigations into the cause of the outbreak are still proceeding.

## Typhoid in Arab Refugees

According to a report in *The Times* of Aug. 9, 49 cases of typhoid have been notified among the 100,000 Arab refugees who are existing in squalor in the hills of central Palestine. The medical officer of health of Ramallah has expressed fear that unless medical help is forthcoming outbreaks of infectious disease among the refugees may cause many deaths.

## Discussion of Table

In *England and Wales* a decrease in the number of notifications of measles 958, whooping-cough 57, and diphtheria 44 was reported, and an increase in notifications of scarlet fever 44 and dysentery 41.

The largest falls in the incidence of measles were Yorkshire West Riding 161 notifications, Essex 115, Yorkshire East Riding 105, Surrey 93, Caernarvon 92, while the only large rise was 61 in Gloucestershire. The fluctuations in the incidence of whooping-cough were increases in Middlesex 53, and Yorkshire West Riding 41, and a decrease of 40 in Cornwall. Only small changes occurred in the local returns of scarlet fever. The chief features of the returns for diphtheria were decreases in Lancashire 12 and Durham 10.

Rises in the notifications of dysentery of 13 and 11 were recorded in the metropolitan boroughs of Hampstead and Kensington respectively. An outbreak of dysentery involving 12 persons was notified in Yorkshire West Riding, Bradford C.B. The other large return of dysentery was Warwickshire 10 (Warwick R.D. 6).

The notifications of poliomyelitis numbered 39, the largest weekly total since January. The only county boroughs with more than one case were Birmingham 3 and Cardiff 3. Counties with more than one notification were London 5, Lancashire 4, Surrey 3, Middlesex 3, Hertfordshire 3, Yorkshire West Riding 2, Yorkshire East Riding 2, and Durham 2.

In *Scotland* the chief feature of the returns was an increase of 27 in the notifications of dysentery. This rise was due to an outbreak in the city of Glasgow, where the notifications increased from 9 to 42.

In *Eire* increases were recorded in the returns for scarlet fever 28 and measles 12, while whooping-cough notifications decreased by 18. In Dublin C.B. the notifications of scarlet fever rose from 23 to 51. The largest returns for measles were Dublin C.B. 31, Clare, Killrush R.D. 18, and Galway, Loughrea R.D. 18.

In *Northern Ireland* a decrease of 25 was recorded in the notifications of measles. Two cases of typhus were notified in the county of Tyrone.

## Week Ending July 31

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,329, whooping-cough 3,309, diphtheria 125, measles 8,211, acute pneumonia 355, cerebrospinal fever 40, acute poliomyelitis 38, dysentery 77, paratyphoid 35, and typhoid 9.

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The Surrey Hospitals Divisional Council held its final meeting at Guildford on July 14. It ceased to exist at the conclusion of the meeting, the work which it had set itself to do since 1941 having been taken over by the Ministry of Health as part of the National Health Services. The council came into existence under the chairmanship of the late Sir Laurence Halsey in May, 1941. It was supported by grants from the Nuffield Provincial Hospitals Trust, the Surrey County Council, the Council of the County Borough of Croydon, the voluntary hospitals of the area, and certain other organizations, and was composed of representatives of those bodies. The main work of the council was the preparation of a plan for co-ordinating hospital services in the area it covered. The plan was prepared and was printed in 1947, and has already proved of assistance to local committees set up under the new organization. At the final meeting a vote of thanks was passed to the chairman of the council and to the chairman of the various committees and sub-committees, and to Mrs. Seabrooke, the secretary's clerk. Special reference was made, and a vote of thanks passed, to Major J. S. Knyvett, who had with such conspicuous success acted as secretary to the council during its whole existence.

# Any Questions?

*Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.*

### White Children in the Tropics

**Q.**—*What are the dangers of life in the Tropics for white children of school age as distinct from adults? Is there any special need for additional supplies of chlorides and vitamins, especially the B complex?*

**A.**—There are no special dangers in the Tropics for white children of school age as distinct from adults, except in so far as children, owing to lack of experience or judgment, may expose themselves to greater risks of infection, trauma, or exposure; but these additional risks may be minimized by supervision, instruction, and training. There is an increased loss of salt in the sweat and urine under tropical conditions, and it is therefore necessary to ensure an adequate salt intake. This should be within the range of 8 to 15 g. daily, according to climatic conditions. If there is any doubt about adequacy of the salt intake the following test should be carried out on a 24-hour specimen of urine. Take 10 drops of urine, add 1 drop of 20% potassium chromate solution, and run in a 2.9% solution of silver nitrate *drop by drop*, shaking after each drop.

Note the number of drops of silver nitrate solution needed to change the colour from yellow to brown; this gives the concentration of salt in grammes per litre of urine. If there is salt deficiency the number of drops will be less than 5. The human requirements of vitamins A and D are not increased by tropical conditions, and there is no reliable evidence that greater amounts of the vitamin-B complex or ascorbic acid are needed. If the child has a good mixed diet, including wholemeal bread, butter, eggs, milk, meat, and green vegetables or fruit, the vitamins will look after themselves.

### Pigmentation and Size of Nipples

**Q.**—*A young woman who is to be married in a few months' time is unduly worried about the fact that her nipples are diminutive and almost colourless. Would stilboestrol increase the pigmentation and size of the nipples, and, if so, in what dosage? Is its use justifiable in a case such as this, where the anxiety and worry are real and cannot be allayed by simple reassurance?*

**A.**—Yes, stilboestrol would increase the size of the nipples and their pigmentation. The suggested dosage is 2 mg. of oestradiol benzoate daily by inunction locally for three weeks after the end of each period. The writer thinks its use is justifiable and the results would allay anxiety and worry. Treatment should be effective within a few months, and could then be discontinued. The physiological results of marriage and pregnancy will subsequently be beneficial to the diminutive nipples.

### Sulphathiazole as a Cream Base

**Q.**—*Cremor sulphathiazole often contains sulphathiazole incorporated in an emulsion-cream base of the lanette wax type. The preparation is rather gritty owing to the crystalline nature of the sulphathiazole. The question arises whether the use of sodium sulphathiazole would be permissible. Would a better preparation result by dissolving an equivalent amount of this salt in the water used to make the emulsion base? On the other hand, would the patient get the full action of sulphathiazole on the skin? A solution of sodium sulphathiazole is strongly alkaline (pH 10): would this affect the tissues or the therapeutic action of the preparation?*

**A.**—Sulphathiazole usually occurs as a micro-crystalline compound, and if this were to be incorporated as an ingredient of a cream it would cause the preparation to be somewhat gritty; but sulphathiazole itself is also available from a number of sources as a perfectly impalpable powder, and there seems to be no reason why this should not always be used in the preparation of a cream. The writer has used it since its introduction and has produced a perfectly smooth cream about which no complaint has ever been made. The use of sodium sulphathiazole, because of its alkalinity, is not to be advised.

### "Mapharside" in Syphilis

**Q.**—*Is "mapharside" superior to the arsphenamines in the treatment of syphilis, with regard to therapeutic efficiency and to avoidance of toxic reactions (jaundice, etc.)?*

**A.**—Opinions differ about whether mapharside is superior to the arsphenamines, especially neoarsphenamine, in the treatment of syphilis. In Great Britain most authorities on the subject favour the latter, but in the U.S.A. "mapharsen" has almost ousted neoarsphenamine. It is probable that there is not much to choose between the two in therapeutic efficiency if mapharside is given twice or three times weekly. As regards toxic reactions mapharside is safer in the dosage usually employed, but this is, in part at any rate, due to the fact that a relatively much smaller dosage is commonly used than is the case with neoarsphenamine. Much of the jaundice that occurred in the last four years, particularly in the Services, was shown to be due to virus infection rather than to arsenic.

### Unpleasant Taste and Hypochlorhydria

**Q.**—*A woman aged 35 complains of an unpleasant taste in the mouth. A fractional test meal shows both total and free acid to be very low. Before withdrawing the last sample I gave her a glass of gin and vermouth (a drink which she often takes) with the result that the secretion of acid in the stomach rose to the equivalent of about 50 ml. of N/10 sodium hydroxide. Is it likely that the unpleasant taste in the mouth is connected with hypochlorhydria? If so, what should one do about it in view of the fractional-test-meal findings?*

**A.**—It is highly improbable that the unpleasant taste in the mouth is connected with hypochlorhydria. The only connexion might be that the low acidity may be an indication of the presence of chronic gastritis or carcinoma. Both conditions may give rise to an unpleasant taste resulting from regurgitation of stomach contents. Further investigation is called for with these conditions in mind.

### Air Conditioning

**Q.**—*What is meant by "air conditioning" of buildings? Is there some article or booklet on the subject, without too much technical detail?*

**A.**—By air conditioning is meant the control of the moisture content, temperature, and purity of the air. It is a "combination of ventilation with heating or cooling." This is a quotation from *Modern Principles of Ventilation and Heating*, by T. Bedford (H. K. Lewis, London, 1937. Price 4s. 6d.).

### Stilboestrol and Prostatic Hypertrophy

**Q.**—*Is the administration of stilboestrol likely to be helpful in ameliorating symptoms due to simple enlargement of the prostate in a man aged 60? If so, what dosage is advised?*

**A.**—Stilboestrol has no action on a simple enlargement of the prostate, therefore the question of dosage need not be considered.

### Second Attack of Measles

**Q.**—*During the recent epidemic of measles I saw a girl aged 2 who I believe had a second attack of measles. I first saw her in April, when she had a mild attack of what I presumed was measles, in the absence of occipital glands, etc. When I was called to see the child in June she was very poorly indeed, with typical morbilliform eruption and very sore eyes. I do not overlook the possibility of the first attack being rubella, but I doubt it. Could it be the measles virus attacking again in a greatly stronger phase after passing through susceptible hosts?*

**A.**—While authenticated second attacks of measles are extremely rare, it would be unwise to say that they do not occur, since there are nearly always exceptions to the rule in biological phenomena. However, a child of 2 would be unlikely to escape with a mild first attack in the month of April, when

measles was prevalent, unless some attempt had been made to modify the infection with adult or convalescent serum. And if the first infection was measles a second more severe and more typical attack three months later would be most unlikely. The chances are that the earlier infection was not measles but rubella or some allergic urticaria. The possibility, on the other hand, that a child who has had an attenuated attack of measles as a result of the prophylactic use of serum or gamma globulin may not acquire a complete immunity to measles needs investigation.

### Effects of Dexedrine

**Q.**—*A patient who complains that he is tired in the evenings and requires nine hours' sleep is in the habit of taking a tablet of "dexedrine" twice daily. This greatly increases his sense of well-being, and he is able to finish a day's work with less conscious effort. Can you tell me: (1) Will dexedrine taken continuously damage the kidneys? (2) Will he become addicted to it? (3) Will it cease to have its present happy effect?*

**A.**—Any healthy subject is tired in the evenings, and many require nine hours' sleep. Generally speaking it is not wise to take drugs such as dexedrine as a regular practice. This drug raises the blood pressure, and may therefore be harmful. It interferes with the formation of aldehydes in the brain, which is surely an undesirable effect to produce daily. It can certainly lead to addiction, as has been found in a considerable proportion of men in American prisons. Whether its good effect will cease is not known, but so far tolerance has not been described. While the use of dexedrine in normal healthy individuals is justifiable occasionally—for example, when it is necessary to drive a motor-car throughout the night—its continuous use in healthy subjects is undesirable. Continuous use should be reserved for psychiatric patients with melancholia or similar conditions.

### Boy's Activities after Epileptic Fit

**Q.**—*A boy aged 14 had one epileptic fit while in bed. He is athletic and keen on riding and swimming. To what extent am I justified in restricting his activities after only one fit, and how am I to estimate the necessity for a sedative and the quantity to be administered? An aunt suffers from petit mal.*

**A.**—It would be wise to prohibit the boy from riding, and from swimming except in the company of another who is aware of the risk and is himself a powerful swimmer. Sedatives should certainly be prescribed, and a reasonable initial dose is phenobarbitone ¼ gr. (50 mg.) daily.

### Complications of Masturbation

**Q.**—*A man aged 35 who practises masturbation recently complained of severe occipital headache during the act and said that it took a long time to obtain an emission. Is there any explanation for the headache (blood pressure is 140), and is there any drug which will materially speed up the ejaculation?*

**A.**—If the headache is directly connected with the habit, it is probably of a psychosomatic type, that is to say, a physical disorder resulting from an emotional cause, acting through the autonomic nervous system. In such a case the emotional cause may be worry due to a mental conflict, of which the patient may be quite unaware, such as that arising from a sense of guilt; a feeling of dissatisfaction with an imperfect form of sexual expression; disgust with himself; fear of consequences associated with early threats; a basic feeling of anxiety which may itself in the first place have led the patient to masturbation as a solace; or a feeling of latent rebelliousness of which masturbation may be a manifestation. In such cases of conflict emotions may be aroused but without proper discharge, the result being manifested in the form of a headache. Such occipital headaches were found to be the most common form of "worry" headaches among the shell-shock patients of the 1914–18 war (less so in the last war). This emotional conflict may also be a cause of the unsatisfactory emission, since the latent and perhaps unconscious sense of guilt or fear acts as an inhibition to the full expression of the sexual emotion. One would like to ask for what reason this patient has to resort to this habit rather than finding more natural forms of expression in adult love. Masturbation may itself be a neurosis, and, as in many cases of neurosis, the symptoms complained of may be an expression of the healthy and *normal* part of his personality rebelling against the more abnormal expression of his sexual instinct. If such a diagnosis is correct, the use of a drug would not cure it, but a frank talk concerning the reason for the habit and for possible worry about the masturbation itself might be more helpful.

### Doubtful Cases of Typhoid Fever

**Q.**—*A man aged 78 suffers from pyrexia, has a very toxic appearance, and a pleural rub; there is no cough or sputum. Widal reaction was positive to typhoid on the 14th day. A specimen of faeces was negative to typhoid bacillus in the third week, and three successive examinations of faeces were negative. He has not previously had an illness suggesting typhoid, and has not had any T.A.B. inoculations. Was this a case of typhoid fever?*

**A.**—It is not stated to which antigens (H or O of *Bact. typhosum* or *Bact. paratyphosum* A or B) and to what titres the patient's serum reacted to give a "positive Widal." Positive Widal reactions in low dilutions of the patient's serum may occur in the absence of enteric infection, and have been reported, for example, in tuberculosis. Successive negative faecal cultures from the third week onwards would not be expected in a case of typhoid fever, particularly if modern selective culture media had been used. Again, a patient aged 78 would probably suffer a severe attack, so that diagnosis could usually be made on clinical symptoms and on the course of the disease. The possibility of some chronic infection or neoplasm in the lung in this case deserves consideration.

## NOTES AND COMMENTS

**Ménière's Syndrome.**—Dr. A. PINEY (London, W.) writes: The answer to the question on the treatment on Ménière's syndrome (July 24, p. 235) does not make mention of the great value of 10 gr. (0.65 g.) of bromide with ½ gr. (8 mg.) of pilocarpine nitrate thrice daily. This mixture, which has much the same composition as a pre-war German proprietary medicine the name of which I have forgotten, prevents attacks in a very large proportion of cases, and can be taken for months at a time without ill effect. Restriction of fluids is sometimes necessary in order to increase the efficacy of the medicine.

**Hypertension and Flying.**—Air Vice-Marshal Sir ALAN ROOK writes: The answer given to the question about the patient with hypertension flying to Canada (*Journal*, July 31, 1948, p. 280) requires comment. More information about the patient is a necessity before a decision can be given. Are there any present symptoms? Have there been any symptoms or complications? An altitude of only a few thousand feet throws an added strain on the heart. To the normal heart this is no matter, but to one already under stress, causing symptoms while at ground level, it may be of considerable importance. Has the patient flown before? Is she of nervous temperament and likely to be in a state of constant apprehension while in the air? A sudden spasm of fear, possibly quite unnecessary, will increase the already raised blood pressure, perhaps with disastrous consequences. The question whether the stresses of a sea voyage are greater than those of an air passage or not is debatable, but at least there is a doctor on board ship with facilities for dealing with an emergency.

It may well be decided when these points, and many others, are taken into consideration that air travel is the best method, but it is not a question that can be answered cursorily in less than five lines.

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**Correction.**—In the article entitled "Surgical Anatomy of the Parotid Gland" by Mr. Hamilton Bailey in the *Journal* of July 31 the diagrams of the deep lobe (Figures 4 and 5) have been printed in the wrong order. The diagram of the "Deep lobe: Variety A, the 'knob'" (Fig. 4) should have been that which appears as "Deep lobe: Variety B, the 'rabbit warren'" (Fig. 5), and vice versa.

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